

# **SCIENTIFIC AND TECHNICAL INFORMATION IN PAKISTAN**

**The report of a joint IDRC/UNDP mission, Oct-Nov 1976**

**Submitted to the Chairman, Pakistan Science Foundation, Islamabad**



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25 January 1977

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Dear Dr. Hashmi

I have the honour to transmit the report of the IDRC/UNDP Mission that visited Pakistan, 21 October to 5 November 1976, to advise on the establishment of national scientific and technical information services, and to re-evaluate the role of PASTIC. The main text of this report was brought near to completion by the members of the Mission as a joint effort while we were still in Pakistan; Annex VI is the result of work done by Unesco staff subsequent to our visit. In the name of all members of the Mission, please permit me to express the hope that our analysis and recommendations will prove useful to you and to your colleagues in the Government of Pakistan.

Also, on behalf of all members of the Mission, I would like to seize this opportunity to express our gratitude for the very hospitable reception that was accorded to us at all the institutions and government departments that we visited. Many individuals were most generous in giving both their time and the benefit of their experience. If we have, to any extent, succeeded in appreciating the realities of the situation in Pakistan, it would be because we had such patient teachers who, for us, made the learning experience unforgettably enjoyable. We are also most grateful for the excellent administrative arrangements made by many, but particularly by Dr. A.R.Mohajir and his colleagues.

I would be grateful if you would also allow me, as the Team Leader, to express my personal appreciation of the cheerful cooperation of my colleagues on the Mission. As you know, these were Mr. Michael Brawne of the University of Cambridge (Unesco consultant on buildings and layout), Dr. Paul Ghelardoni of UNIDO, Mr. L.E.Samarasinghe of Unesco, as well as Mr. Shahid Akhtar and Mr. Sultan Kassum of IDRC itself. I am very grateful for their patience with me and for all their conscientious efforts.

Finally, let me express appreciation, on behalf of IDRC, for the willing cooperation of the UNDP and particularly of the Resident Representative, Mr. Jacob Everts, which made it possible for us to come to Pakistan on a joint Mission and for us to submit a joint report.

Respectfully

John E. Woolston

Team Leader, IDRC/UNDP Mission

## CONTENTS

Letter of Transmittal

Foreword

	Pages
Chapter 1 Summary of Impressions, Conclusions and Recommendations -----	6
Chapter 2 Centralized versus Decentralized Solutions: The Network Concept --	14
Chapter 3 Exploiting International Resources-	23
Chapter 4 The Need for an Information Policy -----	28
Chapter 5 The Social and Economic Sciences --	32
Chapter 6 The Importance of Pakistani Information -----	34
Chapter 7 Information for Ultimate Users - Particularly in Industry -----	36
Chapter 8 Information Handling on Computers -	40
Chapter 9 The Need for Training -----	44
Chapter 10 Constituting a Network Coordinating and Network Support Centre -----	48
Chapter 11 The Need for External Assistance --	53
Chapter 12 A Building for PASTIC -----	56
 Annex I Terms of Reference and Members of the Mission -----	 64
Annex II Individuals/Organizations Visited and the Mission's Programme -----	66

Annex	III	History and Background of PASTIC --	77
Annex	IV	Illustrative Manning Table for PASTIC -----	81
Annex	V	An Experimental Pilot Project to Give Experience in Handling Bibliographic Information on Computers -----	87
Annex	VI	Pakistan Scientific and Technological Information Centre (PASTIC): A Project Proposal ---	91
Annex	VII	Acronyms Used in this Report -----	129

## FOREWORD

As a result of the Workshop on Science Policy held at Peshawar at the end of October 1976, the science and technology policy of the Government of Pakistan is now being reformulated. It would seem that its central aim is, in the words of "The Pakistan Times" editorial for 3 November, the "harnessing of scientific knowledge in the service of socio-economic development and the linking of all activities in the field of specific problems". The proposed policy recognizes the inevitable shortage of both trained people and money, and the absolute need to use whatever is available to the best advantage through the pooling of resources and the co-ordination of activities.

It is within such a framework that the Mission submits its proposals for an information service which, like the sciences and technologies policy itself, is conceived as a support for Pakistan's development programmes. We are convinced that any policy decisions on the future of research and on the benefits to be derived from it must go hand-in-hand with policy decisions on information services. Research is carried out to create new knowledge; information services are provided to place existing knowledge where it can be employed in development planning and development activities. Both are essential.

We have therefore envisaged a network of co-operating libraries and information centres which would be supported and, to some extent, have their services co-ordinated by a central unit. The network is based on existing institutions both for reasons of economy and effectiveness. The principal function of the network and its central unit would be to ensure ready access to the most recent and relevant information. It is only through the establishment of such an information service that we believe that the economic rewards of the country's investment in research and other studies can be realized.

The establishment of the network would itself be a co-operative venture both nationally and internationally. Within Pakistan it will require the closest collaboration among administrators, scientists, as well as librarians and other information specialists, to ensure its success and its early inception. The resources of international organizations and foreign governments should also be engaged to the maximum extent that these can help meet the needs as they are perceived in Pakistan. We are greatly encouraged by the possibility that funds made available through the Technical Assistance Programme of the Netherlands Government could be used to purchase periodicals under its literature programme, and that an allocation of thirty man-months is available to bring foreign experts to Pakistan. Both offers should be taken

up promptly through the Embassy in Islamabad. A proposal for the experimental application of computers to information processing should also be submitted to the International Development Research Centre of Canada in the very near future. The information systems of several UN agencies, particularly the International Nuclear Information System (INIS) and the International Information System for Agricultural Science and Technologies (AGRIS), are already available and need only to be exploited by Pakistan. It is also very much hoped that the Government will, in its UNDP Country Programme, request funds for the development of the proposed information network and thus ensure its realization and proper functioning. We are convinced, moreover, that this co-operative investment of resources within the overall international framework of the UNISIST programme is likely to support Pakistan's economic and social development, and thus benefit all the people of the nation.

## Chapter 1

### SUMMARY OF IMPRESSIONS, CONCLUSIONS AND RECOMMENDATIONS

Pakistan has been one of the principal architects of the Declaration on a New International Economic Order. This Declaration, among other things, calls for action by the international community to facilitate the sharing of knowledge and the transfer of technology on a basis of equality. To implement these recommendations requires all countries to develop national policies with respect to information-handling, policies that must be vigorously pressed domestically and in international forums. Whatever new information systems are established at the international level will be of value to a nation such as Pakistan, only to the extent that the nation itself builds a capacity to exploit these systems. If Pakistan can build an effective domestic information programme, it stands to profit from the multiplier effect that its international initiatives and the New International Economic Order (NIEO) will make available.

The Mission is concerned that it has had very little time to study a vast and complex subject. A new prescription for organizing national information services cannot be offered without an understanding of the subtle inter-institutional - and even inter-personal - relationships that are involved. Such an understanding can be found only among Pakistanis and only after years of experience. Without this understanding, the objectives of the Mission must necessarily be limited. We base our proposals, therefore, on certain general principles and observations that we believe to be valid. When we go into detail, we do so only for the purpose of illustrating what might be done: what is done in the future must be based on Pakistani perceptions of the Pakistani situation.

We strongly believe that something must be done, urgently and with considerable effort. In our view, information is one of the most important resources available for development. It is futile to expend other resources - money and brains - without taking into account the knowledge that is available from previous experiences of development within Pakistan and in other parts of the world. The knowledge derived from previous experiences, and from research and studies, is mostly embodied in words on paper. It is the purpose of an active information programme to make this knowledge available where and when it is needed - for application in development policy-making, planning and operations.

## The General Situation

We have been able to visit only a small fraction of the institutions (see Annex II) that have responsibilities for information-handling within Pakistan, within particular provinces, and within particular institutions. Nevertheless, certain observations emerge, which our Pakistani colleagues tend to confirm from their greater familiarity with the overall situation. To summarize, these are:

1. Because of foreign-exchange difficulties, Pakistani libraries are starved of materials - particularly foreign journals - that are badly needed for planning, research and teaching. The situation in most of these libraries is so bad (some of the most important libraries have no subscriptions to foreign journals this year) that the aggregated effects must be hindering national development to a considerable degree.
2. Although Pakistan itself generates considerable quantities of information related to its own development, much of this is in the form of cyclostyled and mimeographed documents that are produced in quite small quantities. No effective system exists for making an inventory of this valuable material or for making it available when it is needed.
3. Although Pakistan appears to have a well-founded system of agricultural extension services to bring advice and pertinent knowledge to farmers, there are only isolated efforts to provide similar services to small and medium-scale industry. The development of even a modest system for providing technological advice to small entrepreneurs might have considerable benefits in terms of reducing the waste of raw materials and improving the quality of industrial products.
4. Pakistani institutions are served by a dedicated fraternity of librarians who, working under conditions of great difficulty, usually make good judgement of where to place their priorities. We were impressed, for example, by the attention that the university libraries pay to the needs of students, even when



this militates against the provision of service to researchers.

5. But these same librarians often lack knowledge of modern information-handling techniques, and there is a need to build up a corps of individuals well trained to understand and exploit what is potentially available, and with the imagination and will to move forward. Pakistan needs to attract some of its bright young people into information work.
6. Because of the constraints, particularly financial constraints, under which the various libraries are working, each tends to act only within its own constituency of clients - normally within its own institution. The librarians recognize that much better use of available resources would be possible through co-operation among libraries (the whole would be much more than the sum of the parts). But such co-operation requires the development of appropriate tools, the provision of certain equipment, particularly photocopiers, and the active support of the authorities under which the libraries function.
7. At present, Pakistan is not availing itself as much as it might of the information services that are offered on the world scene - particularly through the various United Nations agencies. For example, although Pakistan has appointed a national liaison officer to AGRIS, it has not yet followed through to secure the benefits of this system - in training, in the establishment of a national data base on Pakistani agricultural information, and in exploiting the world data base to locate significant foreign information for Pakistan's agricultural sector.
8. The institutional structures in Pakistan tend to emphasize the separation between the pure and applied sciences ("hard" sciences) on the one hand, and the social and economic sciences ("soft" sciences) on the other hand. This may have unfortunate consequences since, in development work, it is often necessary to make decisions based on the intersection

of technological, social and economic considerations.

9. While Pakistan is in the process of defining a "science and technologies policy" to support its development aims, it has not defined an "information-for-development policy", a policy which would maximize the useful output of its domestic efforts and enable Pakistan to play its proper role in ensuring the construction of better international information systems to respond to the needs outlined in the Declaration on a New International Economic Order.

#### The Situation in PASTIC

In Annex III we have outlined the history of the Pakistan Scientific and Technological Information Centre (PASTIC) and its origins in the former Pakistan National Scientific Documentation Centre (PANSDOC). These institutions have represented efforts to build an essentially centralized service for the nation. The concept of a centralized service was good at the time when it was first conceived (1956) and was consistent with what was then being attempted in many nations at various stages of economic development. Had it been possible to secure a sufficient number of staff, with the appropriate technical background and managerial skills, PASTIC might now be providing significant support to Pakistan's development programmes. Unfortunately, this is not the case: the vision was good, but has not been realized.

The Mission does not see its role as that of a Committee of Inquiry to determine where things may have gone wrong and, with the benefit of hindsight, to make facile statements about what ought to have been done. Other countries have had experiences similar to that of Pakistan. Their attempts to build centralized science information services have also, in many cases, led to indifferent results. From the experience of many countries, it has become clear that the centralized service can succeed only where there is a massive investment, not only in books and journals to build what is without doubt the nation's most comprehensive collection of scientific material but, more importantly, a substantial investment in talent - highly motivated and imaginative staff.

Since the original concept was defined, some twenty years have gone by. In these twenty years, the world has

seen a vast expansion in the production and use of information - the "information explosion". To build a comprehensive National Science Reference Library in PASTIC and all the attendant services would, now, be even more expensive. We believe it to be beyond the resources of the nation, realistically appraised.

As it is, PASTIC is attempting to continue a variety of services, some of which were started many years ago. Mainly because of the shortage of trained staff, several of these services have ground to a virtual halt or are many months in arrears. It is inconceivable that the gaps in some of these services can ever be made up; indeed, with the passage of time, it would be meaningless to do so. Some of the other services, which may have been promising when started, seem now to be of very little utility.

If PASTIC is to continue, and if it is to play a key role in building a national service in scientific and technological information, it must have an adequate corps of professional staff with appropriate skills, confidence and drive. It needs to take a critical look at all of the services it now attempts, strengthening those that can be sustained and that are useful to sustain - and eliminating the others; it must construct new services highly responsive to national needs. But, to begin this process, it must - above all - have a new concept of why it exists and where it is going.

Any new concept that is proposed now must be realistic. It must take account of what has been learned in the operations of PANSDOC and PASTIC; it must take account of the realities of present-day Pakistan, her institutions, her manpower resources, her foreign-exchange resources; it must take account of the experience of other countries in their attempts to build national information services. The Mission sees its role essentially to suggest a new concept for consideration by the Government of Pakistan. The new concept, like the original, must be one that will seek to maximize the exploitation of scientific and technological information as a resource for economic and social development. The original goal was right: what we need now is a new definition of how best to achieve that goal in the light of what has happened in Pakistan and in other countries.

#### Summary Recommendations

The proposals that we make here are elaborated (with other more detailed recommendations) in subsequent chapters. They attempt to take account, not only of the experience of Pakistan, but also of the experience of many

countries which, in aggregate, is expressed in the policies and guidelines developed by Unesco in its UNISIST programme. In particular we follow the shift, now adopted by many industrialized as well as developing countries, away from a centralized concept of information service to one that is based on the co-operation of a network of libraries and information centres each offering a national service within its area of specialization.

1. That the concept of a centralized National Science Reference Library should be replaced by an effort to build a decentralized network of co-operating libraries. The responsibility for providing a national service in information should be delegated sector-by-sector to the most appropriate institutions. A focus for the network (PASTIC) will still be required to provide co-ordination and the development of appropriate tools. Some of the financial resources that might otherwise have been budgeted for the centralized operation should now be administered by PASTIC as straight grants (or as materials and equipment) to institutions that agree to co-operate in the network and provide national information services in their particular sectors.
2. That, to reflect this fundamental change, a new constitution should be written for PASTIC and for the network that it will help to develop, possibly by enacting appropriate legislation. In this document we speak of "The Pakistan Scientific and Technological Information Network" (hereafter referred to as the "PakSTI-Network") whose focus would be PASTIC itself. PASTIC's location in the national government structure should be selected to reflect its role as the focus of the pakSTI-Network, whose other members may be in a variety of federal and provincial institutions, in universities, etc.
3. That the scope of the PakSTI-Network (and also of PASTIC) should be defined to cover the social and economic sciences as well as the pure and applied sciences (including agriculture and medicine). This change should also be reflected in the composition of the National UNISIST Committee which should, in future, concern

itself also with information activities in the social and economic sciences.

4. That PASTIC should have the following principal functions:

- a) the organization, co-ordination and support of the PakSTI-Network - as a network of libraries co-operating sector-by-sector to provide access to their holdings to bona fide users throughout the nation;
- b) the preparation and dynamic maintenance of an "Information-for-Development Policy" for consideration by the Government. This policy would cover both domestic and international aspects;
- c) the maintenance of a national inventory and clearing-house of information produced in Pakistan;
- d) the organization, in co-operation with appropriate institutions, particularly the universities, for the development of Pakistani competence in information-handling (e.g., computer processing) and for the training of an adequate corps of information scientists;
- e) the continuance of its present service of procurement of foreign documents needed by Pakistani users;
- f) the maintenance of translation and bibliographic services to supplement those available at other co-operating institutions within the PakSTI-Network; and
- g) the development of services to re-package technological information in suitable forms and languages to make it more readily assimilated, either directly or through extension services, by small and medium-scale industries.

5. That the role of the provincial sub-centres established by PASTIC should be critically reviewed with the object of possibly reducing them to small offices (two professionals) providing liaison with clients and with the co-operating libraries in the PakSTI-Network.

6. That the Government of Pakistan should give consideration to the status of information scientists within the Civil Service and that, in particular, the grading of staff within PASTIC should be such as to permit the maximum flexibility of assignments, as well as promotion and transfer on merit.
7. That the Government of Pakistan should give high priority within its UNDP country programme to a project that will permit an early start in the building of the infrastructure that will be needed for the PakSTI-Network. A draft project document, prepared by Unesco following the completion of our Mission, is included in this report as Annex VI.

## Chapter 2

### CENTRALIZED VERSUS DECENTRALIZED SOLUTIONS: THE NETWORK CONCEPT

The PASTIC project as it was drafted in 1972 provides for the establishment of a large and comprehensive National Science Reference Library at Islamabad. While we know that this type of institution has proved of inestimable value in certain industrialized countries that made an early start in the development of information services, we feel it is unrealistic in the modern world, and particularly in the Pakistani situation. Today, even in highly industrialized countries, planning leans towards a network of more specialized libraries, each accepting to organize a national service in its particular sector. Thus, for example, the United States has its separate National Library of Medicine and its separate National Agricultural Library.

In reviewing the situation in Pakistan, we find that there are a variety of institutions that, because of a local concentration of specialists, have already built important library facilities. A typical example is the Library of the University of Agriculture at Lyallpur. No matter what is done in Islamabad, the Lyallpur Library will of necessity grow because of the concentration of agricultural research and teaching in its immediate vicinity. We believe that, if only for reasons of economy, Pakistan should seek to reinforce the centres of strength that already exist and to avoid duplicating their efforts as far as possible.

We have learned also of the decisions of the University Grants Commission and the Ministry of Education to develop "Centres of Excellence" for research and teaching in particular topics. We are informed of the centres on solid-state physics at the University of Punjab, on marine biology at the University of Karachi, on geology at the University of Peshawar, on analytical chemistry at the University of Sind, on mining at the University of Baluchistan, and on hydrology and water resources at the Engineering University in Lahore. It would seem to us logical to extend the concept of a centre of excellence for research and teaching so that it can also embrace the areas of documentation and library service. A strong in-house information activity will be a support for research, just as a strong research activity lends an extra dimension to specialized information service.

De facto centres of excellence already also exist in certain governmental and autonomous agencies - for

example, the library and indexing service on economics at the State Bank of Pakistan, the documentation unit for education in the Ministry of Education, the information activities in public health of the National Health Laboratories, the library service in socio-economic development at the Pakistan Institute of Development Economics, and the information services on atomic energy located at PINSTECH. We are sure that, given time for further consultation, other such centres would have been identified in the numerous sectors that play their various roles in Pakistan's development activities.

We believe that a national service should be decentralized and based on these existing resources. To do so involves building mechanisms for co-operation and co-ordination. At first sight, this may appear as opting for a complicated rather than a simple solution. But we believe that a comprehensive centralized service will never be as effective as a decentralized service, that a centralized service would reach a far smaller constituency of clients, and that it would involve a burdensome duplication of expenditures for the purchase of books and journals.

In the network concept, a central focus is still required. It is required, in the first place, to organize the network, to develop norms and standards of service, to provide mechanisms of consultation among the partners, and to construct the necessary tools for co-operation (the production of a national union list of the journal holdings of the co-operating libraries, and the development of an appropriate procedure for handling inter-library loans and the exchange of photocopies). In our view, however, the focus of the network might have functions that transcend these.

For, a library that has hitherto provided service only within its own institution will have to accept significantly greater responsibilities if it is to take its part in a national network and thus provide a national service. These additional responsibilities may, at least in some cases, not be seen as falling within the mandate of the library's own parent institution. Extra staff may be needed as well as an extra budget (and an assured extra budget) for the purchase of books and journals. In general a photocopier will also be essential.

So one function of the focus of the network may be to act as a grant-awarding body to supplement the resources of those libraries that undertake the commitment to provide a national service. Indeed, the Mission recommends that part of the monies that the Pakistan Government has, in principle, already approved for a centralized library be considered as available for



disbursement - under conditions to be formally agreed - to appropriate institutions agreeing to co-operate in a national network.

These grants could be straight financial grants, or - if this better suits the Pakistani situation - it would be equally possible to make central purchases of books, journals and equipment and then to distribute these according to the agreements reached with the individual co-operating libraries.

Giving a financial role to the focus of the network would of course give it much more real power than if it depended solely on voluntary co-operation. Voluntary inter-library co-operation is important, and it can be invoked because this concept has always been part of the ethics of librarianship. But more is needed if a dozen or more libraries are to re-define their roles. The philosophy and planning that support the operations of an institution's in-house library are much narrower than the philosophy and planning needed to support a library that undertakes a national service. Some of the factors are:

- a commitment on the part of the library's parent authorities (to be embodied in a formal agreement);
- an undertaking to follow national norms of service and to participate in the construction of necessary tools of co-operation (e.g. union lists of journal holdings);
- participation in network consultation and planning;
- quick and equal response to bona-fide enquiries from anywhere in the nation;
- compensation for additional responsibilities and work load.

By providing this last factor in the overall concept, the central focus is strengthened in its co-ordinating role: for a library that fails to live up to the national commitments that it undertakes is then, implicitly or explicitly, faced with the prospect of losing its grants in future years.

The members of the Mission have discussed the concept of decentralization with many different librarians as well as with the authorities of some of the institutions that might be involved. There is virtually unanimous agreement that this would be a welcome solution to the problem of

providing national service in information. The librarians welcome it because they see the opportunity to enlarge their individual roles on the national scene, because it offers the prospect of getting more use out of the collections they already hold, and - not least, of course - because it may give them a better assurance of future financial support, thus avoiding the unpredictable fluctuations that so often plague the budgets of the institutional libraries. The authorities within parent institutions welcome the concept as one that provides for the strengthening of local resources and that lessens their dependence on "Islamabad".

On reflection however, some of the people, who otherwise welcome the network concept, express some concern about the problems involved in managing co-operation of this type. They point to the fact that, in all countries, institutions are jealous of their autonomy and resent anything that they see as interference in their operations. They express some fear that the work of co-ordination might lead to bureaucratic delay. But the overall consensus is decidedly in favour of a decentralized approach.

The Mission fully endorses this view. Indeed we regard this as the most important of the recommendations that we offer to the Government. In summary our reasons are:

1. To build a large comprehensive National Science Reference Library in Islamabad would be very expensive, even if it could be achieved. To aim for it without providing a large budget would mean that there is just one more small library on the national scene.
2. That, while in some fields, the greatest concentration of users will be in Islamabad, there are many fields for which the greatest concentration of users is certainly not in Islamabad. Efficiency calls for the location of services as close as possible to these groups.
3. Because these groups exist outside Islamabad, they will demand local service anyway. This means that, if a comprehensive central library is built in Islamabad, it will be duplicating many collections held elsewhere.

4. Whatever is done in Islamabad, there are many advantages in organizing inter-library co-operation in providing services to users. The development goals of Pakistan will be better served by organizing this co-operation as a national co-ordinated programme than by leaving it to voluntary efforts. If we wait for voluntary efforts, they will arise only among the better organized libraries, leaving the poorer ones without support.
5. By strengthening already existing libraries, we engage a much greater resource base - both in terms of collections and, more particularly, in terms of staff. Given effective management, the network concept offers the prospect of providing Pakistan with more service at no greater cost.
6. The management does not require large or complex machinery. Pakistan has experience in much more complicated activities than this. The management and bureaucratic aspects can be kept to a small scale by providing for only a necessary minimum of co-ordination, by having this backed by "the power of the purse", and by leaving maximum scope for local action and initiative.

It is difficult to express in precise financial terms our preference for a decentralized over a centralized solution. To do so implies an estimate of how comprehensive the collections should become. But, even if we make only very modest estimates and assume that Pakistan selects only the most important 10% of the journals published in the world, the costs of acquisition in a centralized library would (including the abstract journals) amount to at least \$500 000 a year for current material and \$5 000 000 for an adequate stock of back issues. These figures omit the operating costs (purchasing, shelving, binding, photocopying). Now, according to our own very rough estimates, the principal libraries in Pakistan are in aggregate spending about \$300 000 for this type of material at present. This is a bad year for foreign exchange and, in a normal year, they might be spending more like \$500 000 out of the resources that are already made available to them. Of course, this involves a substantial degree of duplication. By networking, and a co-ordination of acquisition policies, this sum could be more effectively spent. Then if, in addition, the central focus could make available something like \$200 000 in grants to supplement the resources of the co-operating libraries, the aggregate national collections could be made significantly more complete than those of a centralized library spending \$500 000. In summary, therefore, we believe that Pakistan can get more for a

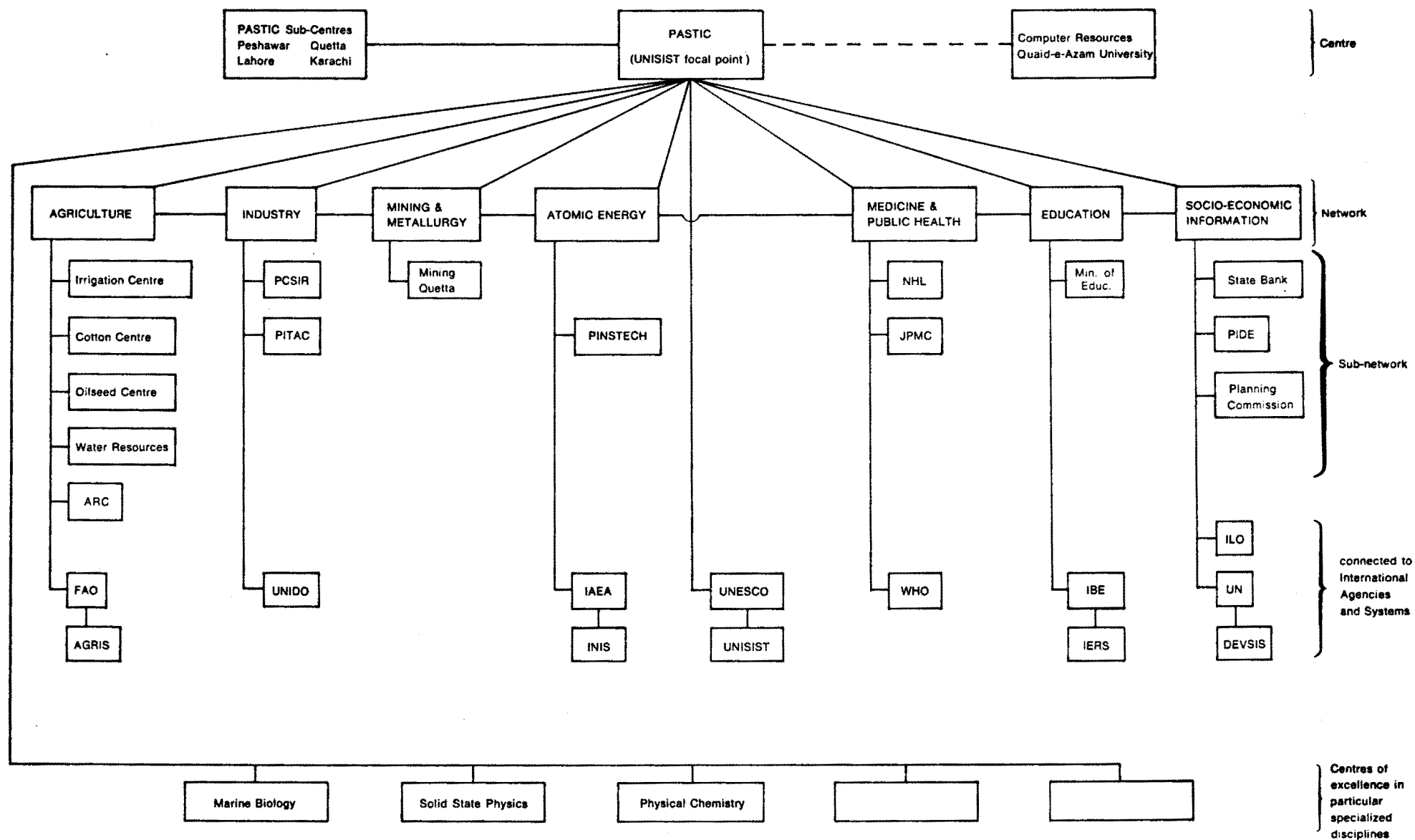
total investment of \$700 000/year in the collections of a decentralized network than for \$1 000 000/year with half of it going into a centralized collection; the cost difference would be even greater if we took into consideration the staff and operating costs of the two alternatives.

But such figures can still be misleading. The main concern is not how much is held, but how much this material is used. By decentralization, we could place the national collections close to the maximum concentrations of users and thus achieve more benefits from the foreign exchange invested in these purchases.

Of course, once the principle of devolution of national responsibilities is accepted, it can be extended in whatever directions appear to be appropriate. We have been informed, for example, that, within the Agricultural Research Council, arrangements have already been made to concentrate certain topics in certain institutions - work on oilseeds to one organization, work on irrigated cereal farming to another, etc. So if, in the overall picture, one institution is identified as being responsible for providing the national library service in agriculture, it in turn may wish to devolve responsibilities for particular topics to a "sub-network" of even more specialized libraries.

The pattern of devolution of responsibilities to a network and then to sub-networks is shown schematically in the attached diagram. We emphasize that this diagram is illustrative only. It will be necessary to review this and to find a pattern of devolution that reflects the true relationships of Pakistani institutions, their lines of authority, and their programme responsibilities. The Mission suggests only that, from the central focus, responsibilities are devolved by broad sectors, leaving the library responsible for each sector to organize its own sub-network as and when appropriate.

# CONCEPTUAL DIAGRAM OF THE PakSTI-NETWORK



**Important Note:** The vertical arrangement of this chart is for convenience only, and it does not imply lines of authority. Each unit of the network would remain within its existing jurisdiction, but would agree to participate in a national plan for managing scientific and technical information resources and services. PASTIC would be the focal point and would have funds available for supplementary financing.

And a responsibility should not be devolved unless and until there is a willing readiness on the part of the co-operating institution to accept its new role. This willingness should be embodied in some sort of formal agreement possibly extending over five years, but with provision for cancellation.

If this recommendation is acceptable to the Government of Pakistan, we also recommend that the network concept be adopted formally, possibly in legislation. It will, of course, be a Pakistani responsibility to select a name for the network. For the purpose of this report, we have called it the "Pakistan Scientific and Technological Information Network (PakSTI-Network)" whose focus would be the existing PASTIC. As will be indicated later in the report, we recommend that the scope of the network extend beyond the pure and applied sciences to embrace also the social and economic sciences (see Chapter 5). If this too is accepted, it might be necessary to remove PASTIC from the responsibility of the Pakistan Science Foundation and to place it at a more appropriate and central location in the Government structure.

The functions of the PakSTI-Network will be spelled out in more detail in subsequent chapters. However, it is worth remarking now that, for one reason or another, there may be areas of responsibility that cannot immediately be devolved. In these cases, the national responsibilities would have to be retained by PASTIC on a temporary basis. However, if the process of devolution is vigorously pursued, this should still not involve PASTIC in the task of acquiring and managing massive collections. Of course, when an appropriate library is identified and accepts its national role within a defined subject area, all of PASTIC's collections within this area should be available for transfer to the new adherent.

To provide the "tools" of network co-operation, PASTIC would necessarily be responsible for:

- establishing a mechanism for consultation among the adherents of the network to ensure its smooth operation,
- developing a co-ordinated acquisitions policy to reduce duplication and fill important gaps,
- maintaining an on-going and up-to-date union list of journal holdings in (at least) the formally co-operating libraries,
- establishing procedures for speeding interlibrary loans and photocopy supply. Introducing a

uniform system of payments (possibly a national coupon scheme),

- conducting studies to improve the operation of the network (with advances in technology and reduction in costs, the possibility of linking the co-operating libraries by Telex should be given consideration as soon as the Pakistan communication system permits this).

The resources and organization needed for these and other functions of PASTIC are detailed in Chapter 10.

## Chapter 3

### EXPLOITING INTERNATIONAL RESOURCES

International information resources could provide the means for meeting some of the deficiencies and gaps in the national information system. In fact, at present PASTIC relies upon a number of foreign libraries in Europe and the United States to meet a large proportion of the requests made to it by the users. The purpose of this Chapter is to provide an indication of the variety of international services which could be exploited for the purpose of obtaining information not available within the national system. There are two types of such services, namely, bibliographic services and the services which provide the full texts of specific articles as photocopies or as microforms.

#### Remote Access to Commercial Bibliographic Services

There exist in the United States and in Europe large computer networks that provide access to a number of specialized data bases which can be searched on-line to provide bibliographic information (and often abstracts) in desired subject fields. One such network is the European Space Agency Information System, also known as ESA/RECON, which has a total of 6 1/2 million bibliographic references contained in such data bases as Chemical Abstracts, COMPENDEX, NASA Data Base, INSPEC, METADEX, etc. By calling up the data base pertaining to the particular discipline or sector of interest of the searcher, it is possible, by interrogation, to obtain references and abstracts relevant to one's enquiry. To exploit this system requires having a dedicated telephone line or satellite link with ESA/RECON functioning at Frascati in Italy, and then results are received almost instantaneously.

The traditional method of going to secondary journals (abstract journals) to locate the references involves many hours of work on the part of the searcher. The automated methods of information retrieval could overcome some of the delay, usually 6 to 9 months, between the publication of a secondary journal and its arrival in this country. One of the negative factors is the high cost of maintaining such a service. The rental of a dedicated line for such an international link is extremely high and, in addition, substantial costs will be incurred as payments for computer time, royalties to the suppliers of the commercial data bases, and for the cost of the equipment.



A demonstration of a link between an automated system and a scientific organization in a Member State of Unesco was conducted in October 1976 at the Tata Institute of Fundamental Research in Bombay, India. About 1 000 scientists used visual display terminals which had been set up at the Institute to obtain recent information on scientific publications pertaining to their particular research topics. The demonstration aroused great interest, but it was generally felt that the investment of about U.S.\$400 000 per year, which represented the cost of operation and exploitation of the system, could not be justified until a more detailed study of the usage of the system had been made.

In the case of Pakistan we feel that although such a system could provide benefits to users in this country by providing rapid information on new publications, its high cost is not justified, at least at the present time.

#### Local Access to International Information Systems

The international community has set up a few international information systems in which Member States collaborate with a particular international organization to build a specialized data base in a particular field. For example, the Food and Agriculture Organization of the United Nations (FAO) has established an international system called AGRIS which collects, and incorporates into its data base, information on agriculture science and technology produced in the 67 participating countries. Each participating country maintains a centre which prepares its material for input into the system, and the FAO has taken on the responsibility for the processing of this material and the distribution of the total file to the participating countries both in the form of magnetic tapes and in the form of a printed announcement service called "Agrindex". Given the appropriate computer facilities, the AGRIS tapes can be manipulated to provide current awareness services (SDI), retrospective retrieval, and the production of specialized bibliographies of particular interest to the recipient nation.

Similarly the International Atomic Energy Agency (IAEA) has established the International Nuclear Information System (INIS) which is built on the inputs received from the co-operating countries. This system now covers about 90% of the total literature dealing with atomic energy produced in the world, and its organization and methods for dissemination of information are similar to those that have been described for AGRIS.

It is the view of the Mission that information-bearing tapes produced by systems of this

sort, which are available to Pakistan free-of-charge, could be exploited here provided the required computer facilities and personnel are available. As mentioned later in this report, following a study made of the facilities in the Computer Centre at the Quaid-e-Azam University, a project for the exploitation of the INIS, AGRIS and other similar tapes available to Pakistan might be initiated with the assistance of IDRC (see Annex V). When more international systems are set up, and provided the necessary facilities are still available, it is conceivable that Pakistan could utilize these as important sources for obtaining information in particular fields.

In view of the fact that one of our recommendations has been the extension of the scope of the PakSTI-Network to cover the social and economic sciences, we would like to mention here the DEVSTIS system (Development Sciences Information System) which is about to be launched. When in operation, this system is expected to cover all information relating to the economic and social aspects of development. The system will be set up and will operate in much the same way as the AGRIS and INIS systems. These international systems respond to the aspirations expressed in the NIEO Declaration and provide for the sharing of knowledge among nations on a basis of equality. Pakistan may wish to use its voice in international forums to call for the establishment of new such systems in the particular subject areas that are of greatest interest for its national development.

#### Local Access to Commercial Bibliographic Services

A number of subject areas are also already covered by computerized commercial data bases, but the annual cost of subscribing to these is quite high. There are many factors which should be considered when determining whether such data bases should be purchased, the most important being whether there is a sufficiently large number of users. For the present, the Mission does not recommend the exploitation of commercial data bases, though at a later stage it is possible that the PakSTI-Network will be called upon to employ these to provide selective dissemination of information and other services. The bibliographic references and abstracts required by users will, in the meanwhile, continue to be obtained largely from secondary journals, and it is hoped that an effort could be made to ensure that these secondary journals are received in the PakSTI-Network with the minimum of delay. The Mission has discussed the possibility of obtaining the services of the Pakistani embassies abroad for the purchase of these journals and to ensure delivery by diplomatic pouch to Pakistan: we strongly recommend that an effort be made to set up such a

procedure.

### Obtaining Full Texts

We have earlier discussed the available possibilities of access to bibliographic information. This is often insufficient for meeting the needs of users who, having identified an article of interest to them, wish immediately to have the full text. On account of the fact that Pakistan obtains a very small fraction of the primary journals produced in the world, these texts must in many cases be sought from abroad. When the bibliographic reference comes from an international data base, AGRIS or INIS, the texts can, in many cases, be obtained from FAO or IAEA on microfiche. In other cases requests have to be addressed to the larger libraries in the U.K., the U.S.A., the U.S.S.R. and other countries depending upon the origin of the article required. This method of obtaining texts from abroad has been practised by PASTIC for many years, and the procedure is reasonably well established. However, many individuals have expressed the wish that, with the re-organization of PASTIC, it would be possible to shorten the delay between the submission of their requests and the receipt of the texts they require. We cannot make any specific recommendation on how this can be achieved, but we hope that, with the establishment of the network and the possibility it holds of a substantial increase in the coverage of journals, the dependence upon foreign sources for obtaining copies of full texts from primary journals will be proportionally reduced.

### Technological Developments

The Mission feels that spectacular technological developments in information processing, storage and dissemination are likely to occur in the next few years. These will be in the field of computer processing and in communications, and their introduction into countries like Pakistan could be expected to improve the present situation to a large extent. Such improvements would provide the technological base for the speedy transfer of information and reduce dependence upon postal services which account for much of the delay now experienced.

### UNISIST and International Technical Assistance

Mention must be made here of the UNISIST programme which was launched by Unesco following an Intergovernmental Conference held in 1971. The programme is now being implemented by Unesco and is directed towards the attainment of five objectives, namely: the

establishment of national, regional and international information policies; the establishment of norms and standards; creating the conditions for systems interconnection; the establishment of training facilities; and, finally, the provision of assistance to Member States for the development of national information infrastructures. The results of the implementation of this programme are available in the form of reports and guidelines to all Member States. Further, Member States are invited to participate in expert meetings, seminars, workshops and other activities connected with these objectives. In addition, Member States may request the assistance of Unesco for the development of national scientific and technological information infrastructures. All these resources of Unesco are at the disposal of Pakistan.

Similarly other international organizations like ILO, FAO, UNIDO, UNCTAD, GATT, etc., have programmes dealing with specialized information resources and assistance in the form of consultants, fellowships and equipment. Relevant documents and information are available from them in varying degrees. Pakistan needs to make maximum use of these international resources, consistent with its own priorities and retaining national control over the development of its own institutions. And, apart from the services available from the international organizations, various sources of bilateral assistance also exist. In this report we make specific recommendations with respect to the assistance that may be available from the UNDP, from the IDRC of Canada, and from the generous programme of the Government of the Netherlands. But, as has been indicated, these are not the only international sources of assistance. To tap these sources wisely, PASTIC must be able to advise the Planning Commission and the Division of Economic Affairs.

## Chapter 4

### THE NEED FOR AN INFORMATION POLICY

In the two preceding Chapters we have discussed issues that can only be described as major policy issues - how best to place information resources at the service of development. The fundamental premise underlying a national information policy is that any economic, social, and political system will perform more efficiently if mechanisms exist to ensure that decision-makers have timely access to relevant information in an appropriate form. The decision-makers may be found at many different levels: from the highest reaches of the government to the factories and farms of the nation. Clearly there is an enormous range of needs to be satisfied, and very careful planning is required if these needs are to be satisfied at reasonable cost.

As the reader will appreciate, some of the policy issues are domestic, affecting inter-institutional relationships and even invoking the question of federal-provincial relationships. Others are international, affecting Pakistan's posture in international agencies and conferences, its applications for international and bilateral assistance, as well as the effective deployment of the foreign-exchange resources that Pakistan allocates to the purchase of foreign literature and data bases.

But, even when our recommendations have been considered by the Government and the necessary decisions have been taken, this will not then establish a policy which is valid for all time. Policy-formulation is an on-going process, which must be based on continuous reviews of the national needs and the national and international capacities to meet these needs. The Mission firmly believes that Pakistani interests will be best served if PASTIC has a small cell devoted to national information policy and preparing recommendations for consideration by the Government. This cell must include a sufficient capacity to make the necessary surveys and to undertake at least the routine work of liaison with international initiatives and systems.

Pakistan has, in fact, recently constituted a cell within the Government for consideration and development of policies with respect to science and technology. It might be argued that the information policy work could be subsumed in the science policy work. We believe, however, that this would be a mistake, even though the two cells would obviously need to co-operate very closely. Information policy invokes, not only the question of information in support of research and development in

science and technology, but a universe of social and economic information as well. It would be unsatisfactory to have one cell establishing policy for scientific and technical information and another cell establishing policy for social and economic information.

Some of the domestic issues that need to be kept under review are:

- the effectiveness of the network system, the trade-offs between centralized and decentralized solutions to the various problems that arise;
- the trade-offs between formal and informal relationships in the functioning of a decentralized network - when to give particular arrangements legal force in federal legislation or formal federal-provincial agreements;
- the supply and demand for information manpower, in terms of both quantity and quality. What arrangements should be made with the universities, intermediate colleges, etc., to ensure an adequate supply. What arrangements might be needed in other institutions for on-the-job training;
- the development of the information profession, the role of professional associations, the status of information workers in the Civil Service;
- the cost-effectiveness of the financial investment in information services. Where is the point of diminishing returns in the further elaboration of such services;
- the introduction of new information-handling technology. Are Pakistani institutions ready to support services based on Telex, microfiches, facsimile transmission, on-line information retrieval from computers, automation of library operations, etc.

Some of the international issues that need to be kept under policy review are:

- Pakistan's posture in international agencies and conferences with respect to the building and maintenance of international information systems (INIS, AGRIS, IERS, DEVSIS, etc.) and

international information programmes (UNISIST, UBC, NATIS, ISO). Instructions and briefs for delegates representing Pakistan in international forums;

- Pakistan's access to international and bilateral assistance in support of PASTIC and the PakSTI-Network. Priorities for inclusion in the Country Programme and consultations with all potential international and bilateral partners;
- priorities for foreign-exchange expenditures related to the building of better information services for Pakistan. whether and when to purchase access to commercial data bases, to acquire modern equipment, to set the overall level of acquisition of foreign books and journals;
- Pakistan's policy with regard to international copyright law, conventions and treaties, securing rights to re-publishing facsimile editions or translations for use within Pakistan;
- identifying opportunities for Pakistan itself to establish publishing or other information-handling programmes of international or regional stature. (In this connection, it should be noted that several developing countries, particularly in Asia and Latin America, are now setting up international or regional "centres of excellence" dealing with information in specialized areas for which they have particular competence. Pakistan can, in the future, also look forward to filling this role in certain areas which are of prime interest to the country and for which Pakistan can, because of its experience, take a leading position.)

The Mission, therefore, recommends the creation of an Information-Policy Unit within PASTIC, working with the other participants in the PakSTI-Network and carrying its recommendations to the appropriate organs of Government. Of necessity the Unit will require its own small research staff which will be responsible for conducting the surveys and studies on which policy recommendations can be based.

Finally, the Mission wishes to refer to the UNISIST Meeting of Experts on Regional Information Policy, which

was held in Sri Lanka in December 1974, and in which Pakistan was represented by Dr. Z.A. Hashmi and Dr. A.R. Mohajir. The final report of this meeting, as well as the report of a follow-up meeting held in New Delhi in 1976, have been submitted to the Government of Pakistan by Unesco. In the formulation of its information policy, the Mission would advise the Government to orient its policy both at national and regional levels in accordance with the recommendations of the UNISIST programme on information policy development.



## Chapter 5

### THE SOCIAL AND ECONOMIC SCIENCES

In discussing any information activity, it is important to define the subject scope within which it will operate. To leave this vague leads to many difficulties, particularly in knowing the volume of the collections, as well as the staff and financial resources, that will be required. PASTIC was set up to cover "science and technology" which was certainly seen to include information of interest to industry, and probably agriculture and medicine as well. But it was not seen to cover the social and economic sciences.

As a result, some initiatives have previously been undertaken in Pakistan to propose the formation of a separate Social Sciences Documentation Centre, which would do for these subject areas what PASTIC was conceived to do for the natural sciences, pure and applied. So far, no concrete action has been taken to establish such a new Centre. This, therefore is an opportune time for the Government of Pakistan to consider whether it wishes to establish two separate activities, one defined to cover the natural sciences, the other to cover the social and economic sciences - or whether to combine these under a single roof.

The trend in international programmes and in the information programmes of many countries is to deal with all these subjects under a single institutional umbrella. Unesco's UNISIST programme, which was originally conceived to cover only the pure and applied sciences has now been extended, at the express wishes of its Member States, to cover the social and economic sciences as well. These trends reflect a realization in the world that development decisions occur at an intersection of technological, economic and social considerations. To make such decisions on technological considerations alone can lead to harmful consequences. It is easier to bring the relevant information together for a particular decision if, in fact, the various components can be found in a common programme.

The Mission believes that the development interests of Pakistan will be best served by defining the scope of PASTIC to include also the social and economic sciences. The reasons are fairly obvious, but can be enumerated as follows:

1. To establish two programmes would involve some unnecessary duplication of staff, equipment and buildings.

2. The two programmes would probably report into different agencies of the Government, thus making it more difficult to achieve co-ordination and a balanced application of resources.
3. If the network concept is adopted for both activities, the networks will intersect not only in Islamabad but at many other locations in Pakistan, thus causing confusion and multiplying the problems of co-ordination.
4. If the Government accepts our recommendation that an Information-Policy Unit be created to prepare Pakistan's posture with respect to international information programmes, it is a vital national interest that this posture be consistent. But if there are two policy cells, there is a danger that different instructions will be prepared for different delegations.

In the remainder of this report and in formulating our suggestions for the organization of PASTIC, we have assumed that it will have a broad mandate including the social and economic sciences. This then throws in question whether PASTIC should be located with the Pakistan Science Foundation - or with another agency of the Government. The Mission is not competent to recommend the most appropriate location for this activity, but believes the matter should be given earnest consideration by an inter-departmental authority.

## Chapter 6

### THE IMPORTANCE OF PAKISTANI INFORMATION

Particularly in the recommendations of Chapter 3, the Mission has tried to suggest mechanisms by which Pakistan may more readily achieve access to the information produced in the rest of the world. The importance of this cannot be denied; as we move more and more to an interdependent world, the work done in other countries becomes increasingly significant to the economic and social development of one's own country.

But, still, in the foreground of interest for Pakistan is the information that is generated within Pakistan, about Pakistan. For information is not generated spontaneously or by accident. It is generated because someone decided to invest money and brains in research, surveys or other forms of study. The aggregate of the information generated within Pakistan represents an aggregate of Pakistani perceptions of what is important to the country.

But much of the information that is generated as a result of Pakistani investments is issued as cyclostyled or mimeographed reports in small quantities. Copies are retained within the institution that issued them, or are distributed to only a small number of other institutions. The cream of the more academic material is published in journals (which PASTIC has been announcing in "Pakistan Science Abstracts"), but this is only the tip of the iceberg.

If Pakistan is to derive full benefit from the information that it has itself generated, there is need to make a national inventory of this, to adequately index the inventory, to provide means of access to users all over the country, and to support the activity with a clearing-house service offering photocopies or microform copies of the original documents.

The Mission firmly believes that one of the most important functions of PASTIC is to build such an inventory and to provide the necessary services to be derived from it. We recommend that, within a few years, the inventory be maintained in a computerized system. But it should begin as soon as possible and be maintained by conventional indexing until such time as PASTIC has the expertise to move into automation. In our recommendations for the organization and structure of PASTIC (see Chapter 10 and Annex IV), we made provision for a special Unit to carry out this work. The task of collecting this material and shelving it should have the highest-priority call on the time of the staff of PASTIC's library. Obviously this

work of acquisition would be greatly aided if, in any legislation constituting the PakSTI-Network, a statutory provision is made calling for the deposit of appropriate material at PASTIC.

If this information is secured and maintained in good order, it will be a rich resource for the unit in PASTIC responsible for responding to users' requests; it will also be a rich resource for the proposed Bibliographic Unit, and it will be particularly valuable for the Development-Support Unit which must obviously keep Pakistani information in the foreground of the material which it prepares as extension aids to small and medium-scale industry.

The construction of an inventory of Pakistani information would be of great assistance to those organizations in the network that also act as Pakistan's participating organizations within international information systems. Thus PINSTECH represents Pakistan in the International Nuclear Information System (INIS) and the Agricultural Research Council represents Pakistan in FAO's AGRIS. Each of these Pakistani organizations accepts responsibility to report relevant Pakistani material to its international system and, in return, is eligible to receive the world data base and to exploit it for the benefit of Pakistani users. The Mission has considered how Pakistan might make better use of these valuable international resources (see Chapter 8), which reinforces the need to ensure that the Pakistani input is comprehensive.

If our recommendations with respect to a national inventory of Pakistani information are accepted, this will help PINSTECH and ARC in their co-operation with the existing international systems. But it will also prepare Pakistan for its participation in future international systems organized on the same co-operative model to respond to the needs of the NIEO. Several such systems have been proposed, particularly in the social and economic sciences (DEVSIIS for the social and economic aspects of development programmes, POPINS for questions of population and family planning, and other systems to deal with human settlements, water supplies and sanitation, mineral resources, etc.).

Thus the national inventory of Pakistani information is needed both to ensure the maximum return in Pakistan from national investments in the generation of information, and to facilitate Pakistan's participation in the international co-operative systems that can bring valuable foreign information to support Pakistan's development efforts.

## Chapter 7

### INFORMATION FOR ULTIMATE USERS - PARTICULARLY IN INDUSTRY

In a country where agriculture and industry have been given priority in the development plan, it is obvious that special attention should be given to provide these two capital economic sectors with all relevant scientific and technological information and find the most appropriate ways and means to transmit this often highly technical information into a form and a language readily accessible to all users, in particular the farmers and the medium and small-scale industrial enterprises.

We have learned a little about the efforts of the federal and provincial governments, as well as certain universities, such as that at Lyallpur, to provide agricultural extension services to farmers. This involves the production of leaflets in local languages, face-to-face visits by extension workers, and a significant amount of radio programming. The Mission can only commend these efforts and look forward to their greater expansion and effectiveness. We are disturbed, however, that this - except in isolated instances - does not seem to be matched by a similar set of extension services aimed at enhancing the effectiveness of industry. In the chapter on "Industry" of the "Draft Proposals for National Science and Technology Policy (Revised)", Pakistan has assigned priority to industrial policies and programmes aiming at creating new employment and reducing dependence upon foreign sources of raw materials and technologies. This document stresses the urgent need to strengthen the links between technological research and industrial development, in particular with a view to promoting labour-intensive industries, making greater use of local raw materials, developing indigenous intermediate technologies especially for small-scale industries, ensuring adequate standardization and quality control of industrial products, and increasing productivity. In the same proposals it is indicated that Industrial Extension Services should be created and organized on the pattern of Agricultural Extension Services.

This Chapter will deal with the application of scientific and technological information to industry, which is specifically mentioned in the terms of reference of the Mission.

During its visits to the provinces of Punjab and Sind, where manufacturing industry is particularly representative, the Mission had the opportunity of meeting representatives of research institutes generating information for industry as well as professional organizations grouping users of this information.

The conclusions drawn by the Mission from these contacts may be summarized as follows:

Some extension work is being conducted by scientific and technological institutions in order to keep their clientele (medium and small-scale industrial enterprises) informed of the results of their work in industrial technology. Thus the Pakistan Industrial Technical Assistance Centre (PITAC) in Lahore maintains a technical library and publishes a quarterly magazine "Pakistan Productivity" disseminating information on technology relating to tool design, chemical engineering, foundry engineering, welding and metal fabrication. Members of PITAC's technical staff visit industries and offer technical advice on the factory floor. The Pakistan Council of Scientific and Industrial Research (PCSIR), through its multi-disciplinary laboratories in Karachi, conducts a liaison service with industry and publishes a monthly News Bulletin and a periodical entitled "Technical Information Bulletin" giving information on feasibility studies and its technical services. The Chamber of Commerce and Industry of Karachi, although not dealing directly with technological queries, forwards these to consultants among its members. It disseminates information mainly on trade opportunities through its weekly publication entitled "Trade Journal". Some industrialists' associations grouping mainly representatives from medium and small-scale industries, e.g., the Textile Mills Association, also publish periodical news bulletins. Some extension work is also being done by the Pakistan Industrial Credit and Investment Corporation (PICIC) in Karachi through its quarterly news bulletin.

But this extension work, although valuable, is isolated and of limited scope. In the opinion of this Mission the main potential users of industrial information, i.e., the medium and small-scale enterprises, are not aware of the appropriate sources of information; or, when technological information is available to them, they are often not in a position to use it, because it is formulated in highly technical terms not understandable by them (many such entrepreneurs are not engineers but businessmen), or even written in a language (English) which is not their mother tongue, and with which they are not at ease.

For these reasons the Mission thinks that particular attention should be paid to develop, within the PakSTI-Network, a mechanism through which technological information can be made more easily accessible to industry, in particular to medium and small-scale industry.

As has already been recommended, a Development-Support Unit should be established within PASTIC with the following functions:

- i) to identify the specific information needs of Pakistani industries, particularly the medium and small-scale industries; to respond to technical enquiries from these industries or from extension services supporting these industries - either directly or by reference to other institutions in the PakSTI-Network or by reference to services of information outside Pakistan; to ensure the development of PASTIC and the PakSTI-Network services responsive to the needs of industry;
- ii) to review technological information available from within and from outside the country which is of relevance to industry, as well as publications issued by international and regional organizations involved in industrial development, in particular the United Nations Industrial Development Organization (UNIDO), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Regional Co-operation for Development (RCD) and the Asian Productivity Organization (APO), and re-package it in the form of periodic publications that would be written in the vernacular and use a terminology understandable by non-specialists. In addition to digests of technological reports and other materials, these publications would include a recurrent column devoted to the activities of UNIDO and its advisory services, in particular its Inquiry Service, which are of direct interest to the medium and small-scale industry in relation to queries related in particular to appropriate technologies, choice of industrial equipment, product design, standardization and quality control, licenses and know-how agreements. In preparing these publications, the Development-Support Unit would also have to co-operate with the appropriate Pakistani Government agencies generating technological information, such as the Appropriate Technology Development Organization of the Planning and Development Division. The substance of these publications should also reflect the priorities set out by the industrial development programme of the country;
- iii) to ensure adequate dissemination of these publications to all potential users throughout

the country, policy-makers and institutions in the field of industrial development as well as medium and small-scale industrial enterprises. These publications could be sent directly to the professional organizations representing the groups of users. Another possibility of having this information made widely available to the users would be to insert it in the periodical information bulletins published by the professional organizations, such as the Chambers of Commerce and Industry and the industrialists' associations. In this connection a very encouraging offer was made by the Chamber of Commerce and Industry in Karachi during the visit of the Mission, to open such a column in the Chamber's "Trade Journal";

- iv) to act as the national focal point for the UNDP programme to promote "Technical Co-operation among Developing Countries (TCDC)", engaging public and private enterprises in this programme to the extent that Pakistan's national interest dictates;
- v) to publicize the industrial information services of the PakSTI-Network through the mass media (radio and television) as is done for the agricultural extension services; to organize lectures and seminars on PASTIC's and the PakSTI-Network's information services for the members of Chambers of Commerce and Industry and industrialists' associations throughout the country.

The four PASTIC Liaison Offices in the provincial capitals would assist the Development-Support Unit in collecting relevant technological information to be processed and in disseminating the re-packaged material to the users.

The Mission believes that through these promotional activities, the PakSTI-Network will contribute to improve the productivity of the medium and small-scale industries of the country and the quality of their products through a better utilization of the domestic raw materials and indigenous technologies, thus reducing dependence on abroad and economizing foreign exchange.



## Chapter 8

### INFORMATION-HANDLING ON COMPUTERS

As the focal institution within the PakSTI-Network, PASTIC will need to guide, stimulate and co-ordinate, first, the development of national information resources and services and, second, the participation of Pakistan in international information programmes. We have previously pointed out that there is a widespread interest within Pakistan to make more effective use of secondary information services and data bases. To this end, it therefore seems reasonable to ask that PASTIC should build a competence in modern information-handling techniques. This competence, once acquired, would not only assist the PakSTI-Network to offer better services to its participating institutions and users, but would also allow it to exploit the international information systems that are now being offered by the United Nations and its agencies (for example, INIS and AGRIS, but with the prospect of additional systems, such as DEVSIS and POPINS, in the future).

Over the last few years, the need for automatic procedures in the collection, processing and dissemination of bibliographic information has become increasingly apparent in the light of the "information explosion" affecting both the "hard" and "soft" sciences. And, with the arrival of computers and modern communications systems, new possibilities have been opened up. The international information systems have been designed to respond to these possibilities and to provide their benefits to both developed and developing countries. Some organizations have installed computer systems even for managing their library requirements - the acquisition of material, cataloguing, indexing, abstracting and retrieval. In all cases, the ultimate aim is to provide a service that will respond promptly to the specific or general needs of the users. To this end, computer systems for the retrospective searching of large files and for the selective dissemination of information from current files (SDI) are now routinely available in many countries.

The Mission notes that PASTIC, under its present circumstances, does not possess the basic means (staff or budget) to establish a competence in these modern information-handling techniques. And the Mission does not believe that, in reforming PASTIC, elaborate facilities should be introduced immediately. Before computerized systems for bibliographic information processing can be successfully installed, it is essential that a knowledgeable and competent resource team should be brought into existence to advise on the intelligent and

practical choice of computer systems and their implementation.

A few years from now, the most important computerized services that PASTIC could envisage are:

- 1) maintaining an up-to-date union list of periodicals for the PakSTI-Network;
- 2) collecting, processing and disseminating information on on-going research in Pakistan;
- 3) maintaining the national inventory of Pakistani information (Chapter 6); and
- 4) maintaining directories of professionals.

With appropriate experience, PASTIC (or a resource team working for PASTIC) could also provide policy and practical guidance on the introduction of international data bases into Pakistan and their exploitation for SDI, retrospective searching and the preparation of specialized bibliographies responding to Pakistan's specific interests.

To work toward these goals, the Mission feels that some pilot experimental projects should be implemented within Pakistan to build up knowledge and experience on a step-by-step basis.

The Mission visited the computer centres at the Quaid-e-Azam University (Islamabad), the United Bank Ltd. (Rawalpindi), the Computer Bureau of Pakistan (Islamabad), and the State Bank of Pakistan (Karachi). The talents of software personnel at these centres are of high calibre, and the computer and other facilities are basically adequate for the tasks under consideration. In particular, the Quaid-e-Azam University's computer, the IBM 360/44, although procured in 1972 primarily for scientific calculations, is now providing commercial processing capabilities to many outside organizations in Pakistan. The Mission concluded that, of the centres visited, the Quaid-e-Azam University's Computer Centre would be the most appropriate base on which to build a resource team - in terms of staff, equipment and computer time available.

Indeed, in view of the interest expressed at Quaid-e-Azam University, the Mission felt that it could even now make specific recommendations for some small pilot experimental projects which would immediately profit

a number of institutions and, at the same time, build the necessary know-how and expertise.

For these experimental projects, the University's Computer Centre would need to be teamed with appropriate institutions or libraries that seek to provide information services to particular clienteles in their own subject fields. Of the various institutions that might work with the Computer Centre in bibliographic applications, the Mission identified four that appeared to offer good promise for early effective use of computer facilities, at least on an experimental basis. All four can also be considered as potential candidates for recognition as participating institutions in the PakSTI-Network. They are (1) PINSTECH for SDI services exploiting the INIS data base; (2) ARC for SDI services exploiting the AGRIS data base; (3 and 4) the Planning Commission's Documentation Cell and the Library of the Pakistan Institute of Development Economics (PIDE) for the management of library operations and the exploitation of data bases in the social and economic sciences.

Two years is the amount of time that we believe would be needed to implement these projects, to run them on a regular but still experimental basis, and to evaluate the results. The most ambitious project is the one that would serve the Planning Commission and PIDE. This would involve building a data base to describe the information held by the two institutions and to permit its ready retrieval. Data bases constructed by other organizations concerned with economic and social development, e.g. IDRC and the International Labour Office (ILO), could be acquired for obtaining access to a larger universe of information that may be useful for development policy-making and research. Because Pakistan is a Member State of ILO, it would be possible for the Quaid-e-Azam University to acquire, essentially free-of-charge, the software package ISIS - Integrated Set of Information Systems - developed at ILO. The Mission feels that ISIS, implemented on the University's computer, would greatly enhance the effectiveness of the documentation activities in the Planning Commission and PIDE. It could provide searchers in these institutions with selective on-line access (via video terminals) to more than 100 000 items of information of potential relevance to decision-making and research.

The experimental projects with PINSTECH and ARC are less ambitious. Because of Pakistan's existing commitments to the international information systems, INIS and AGRIS, the nation is entitled to receive, free-of-charge, the monthly magnetic-tape service provided by each system. The Computer Centre would need to acquire an appropriate SDI software package. This may, indeed, be

available as a component of ISIS, or programmes specifically prepared for this purpose may be acquired through the agency of the IAEA or FAO. In either case, there would be need for PINSTECH and ARC each to train one or two staff in the techniques of "profile-writing" to ensure the production of relevant current-awareness services to the scientists they serve.

Annex V sets out in more detail the objectives, methodology and manpower requirements for these experimental projects. The Mission recommends that the Government of Pakistan make application to IDRC for financial and technical support in their implementation.

If the Government of Pakistan approves these projects, it would build in Quaid-e-Azam University a resource base of knowledge and experience on which PASTIC and the PakSTI-Network could subsequently draw; it would bring immediate benefits to the clients served by PINSTECH, ARC, PIDE and, the Planning Commission. Apart from the application to IDRC, the Government would also need to make a formal request to ILO for the release of ISIS software.

The Mission strongly recommends that PASTIC transfer its ICL tabulating machine, sorter and key punch/verifier from Karachi to Islamabad. This equipment has been previously used by PASTIC staff for various applications related to the dissemination of information. For certain small applications, this equipment could be used alone, or it could be used for the preparation of input to the computer at the University.

In Annex IV, in the manning table for PASTIC, provision has been made for an eventual data-processing unit. As a start, the ICL equipment could be put under the responsibility of this unit and the staff augmented as the opportunities develop for more sophisticated processing of bibliographic information. Funds should be released to purchase additional equipment, such as terminals, key-punch machines, etc., when PASTIC is ready to employ the Quaid-e-Azam University computer facilities.

## Chapter 9

### THE NEED FOR TRAINING

The Mission paid special attention to the availability of the necessary specialized manpower for the various components of a national information network. From the commencement of our study it was apparent that one of the most serious drawbacks to the efficient functioning of PASTIC has been the shortage of professional and semi-professional staff with appropriate skills. We, therefore, examined in some detail the available training facilities in the country and had consultations at the library schools of the Universities of Karachi and Lahore, with members of the library profession and with professional associations.

We were informed that each year, a total of about 300-400 librarians graduate with Masters' degrees or postgraduate diplomas from the four library schools at the Universities of Karachi, Lahore, Peshawar and Sind. From our discussions with faculty members at the Universities of Lahore and Karachi, we learned that the orientation of the courses at the library schools is almost entirely towards the production of traditional librarians rather than information system specialists. Although there is a recognition that the curricula should be modified and modernized, no such re-orientation has so far been introduced. Consequently, while the output of librarians is substantial, the individuals are not trained to fill the manpower needs of modern information systems, which partly accounts for the lack of such systems in the country today.

It is also the case that the great majority of the students enrolling in the library schools have taken arts or humanities for their Bachelor's degrees; very few have had any subject training in the sciences or technology. As much information work does require a background in the sciences, this is an additional handicap for Pakistan in its efforts to build an effective information programme responding to the needs of scientists and technologists. And, because of the lack of sufficient highly qualified teaching staff, the universities have been unable to start research programmes in librarianship or information science; the one exception is at the University of Karachi which has established a doctoral programme, but this is only very recent.

In addition to studying the training programmes for professional librarians, the Mission also examined the programmes that are available outside academic institutions for the training and retraining of persons connected with libraries. We were informed that there are

private organizations which provide short courses and award certificates. The Pakistan Library Association (PLA) is concerned about this practice, as the quality of the training seems to vary considerably and no mechanism of accreditation is in force. As these are private organizations, PLA is not able to exert pressure on them - to oblige them to adopt standard curricula, or to submit their candidates for external examination. The Mission accepts that there is a substantial need for "semi-professional" staff and that private organizations may have an important role to play. Perhaps the most effective way to raise the standards and make them more uniform is to introduce a system of accreditation to be monitored by the PLA, and then to advise employers, including government organizations, to recruit middle-level library staff only from the accredited training organizations.

We have also discussed with the Pakistan Library Association and some of its branches the possibility that the Association itself could take the responsibility for middle-level training. As, in present circumstances, such training would have to be done by members of the Association in addition to their normal work, a mechanism for providing compensation would have to be found. The Mission has not made sufficient study of this alternative to make a firm recommendation, but it believes that the appropriate authorities - presumably the Ministry of Education - should explore the possibility of developing middle-level training for library personnel by employing the talents of the nation's more experienced librarians within the professional framework of the Pakistan Library Association.

The above summary of the training facilities existing in this country indicates a lack of information specialists at the professional level, and a lack of middle-level technicians who could normally be responsible for carrying out many library functions and information services under supervision. We have also noted a lack of reprographic personnel who would be involved in the preparation of micro-film, microfiche and in printing operations.

The establishment of a national information network would require that these gaps in manpower supply be filled as soon as possible. In our discussions with the Chairman of the Pakistan Science Foundation and with the Governing Board of PASTIC we were made aware of their pre-occupation with this particular problem. The Chairman informed us of his readiness to take emergency measures to improve the situation, and the recommendations which we make below are based on the consensus reached in our discussions.

As no university in the country provides courses leading to the production of information specialists, it is suggested that about 10 to 15 Master of Science graduates who have offered science subjects for their degree should be selected for advanced training in information science. These trainees would receive fellowships from PASTIC and would undergo a one-year course to be organized by Quaid-e-Azam University in collaboration with PASTIC. At the end of the course, successful fellows would receive either a degree or diploma in information science, subject to such an arrangement being negotiated between PASTIC and the University. The course would include theoretical and practical training in information-handling, such as abstracting and indexing, computerization techniques and information services and systems. The Computer Centre of Quaid-e-Azam University could be called upon to provide instruction on data-handling and processing as well as information retrieval and selective dissemination of information based on its expected experience with the AGRIS and INIS data bases and with ISIS (see Chapter 8 and Annex V). The implementation at PASTIC of a national inventory of Pakistani information and a register of on-going research in Pakistan could provide opportunities for practical training in the organization of information files, their computerization and exploitation. It may be envisaged that the information specialists produced by the proposed course could join the staff of PASTIC itself or other centres co-operating in the PakSTI-Network and its sub-networks.

In view of our earlier statement that there are now, in all practical terms, no information specialists in the country, such a training programme will need to be reinforced with foreign expertise. This could be done by engaging any foreign experts assigned to the proposed UNDP project or consultants provided by international organizations to teach courses during a semester. Perhaps a start can be made towards this end by PASTIC availing itself of the consultant services that the Technical Assistance Programme of the Government of the Netherlands is presently in a position to offer to Pakistan.

In addition to the training of information specialists in the country, it was suggested to the Mission that fellowships should be made available for overseas training of a small number of Pakistani nationals in advanced information science. These should be carefully selected for their future leadership potential, and then could be sent abroad to study the development and management of information systems and services and to acquire experience in the operation of modern information systems in more developed countries. It is expected that, on their return, they would then be able to pass on the

benefits of their experience to their compatriots and provide leadership in the further development of the national information network. Such overseas training can take the form of attendance at normal courses of instruction on advance information technique at universities, in the specialized techniques of computerization (some courses are offered by IBM and other computer manufacturers), or in refresher courses organized by international organizations such as Unesco, FAO and IAEA.

We further suggest that PASTIC, after its present equipment resources have been augmented through the establishment of the UNDP project (and pending the re-organization of middle-level training on a national basis), should undertake a crash training programme for middle-level personnel who will be directly involved in indexing, abstracting and reprographic activities both at PASTIC and at the other participating institutions in the PakSTI-Network.



## Chapter 10

### CONSTITUTING A NETWORK-COORDINATING AND NETWORK-SUPPORT CENTRE

To summarize, we have recommended the establishment of a Pakistan Scientific and Technological Information Network (PakSTI-Network), which would be co-ordinated and supported from a central focal point, viz, PASTIC. We have recommended that the location of PASTIC within the government structure should be re-examined by the competent authorities.

The functions of PASTIC that have been identified so far are:

1. the co-ordination of the network (Chapter 2);
2. the administration of grants to libraries and information centres participating in the network (Chapter 2);
3. the preparation of network tools (Chapter 2);
4. the preparation of Pakistan's information policy, both domestic and international (Chapter 4);
5. the development of a national inventory of Pakistani information and a clearing-house to ensure its effective dissemination (Chapter 6);
6. the maintenance of a development-support service interpreting information into forms that can be assimilated by various user groups, particularly small and medium-scale industries (Chapter 7);
7. the development of a competence in modern information-handling techniques, including computer processing (Chapter 8);
8. the organization of appropriate training as a national programme in information science (Chapter 9).

We now need to consider a few other functions to be added to this list. Clearly, with the acceptance of the network concept, there is no longer a need for PASTIC itself to develop massive collections. But it will still need a modest library. It will need a good collection of abstract journals and reference books if it is to successfully maintain a capacity to respond to enquiries;

it will need a collection of information-science books and journals if it is to successfully develop a national information policy; and it will need to temporarily retain collections in those areas which cannot, for one reason or another, be devolved to co-operating libraries elsewhere in the network. For policy-making, and for the effective dissemination of information, more information is needed on the on-going research programmes in Pakistan and on the potential users of information. We recommend, therefore, a continuing effort to keep an up-to-date register of on-going research in the country and a new effort to maintain current directories of scientists, scientific institutions, etc., in the country.

The service of responding to enquiries will involve a significant amount of referral work (to other libraries in the network), a significant amount of photocopying and inter-library loan business, and a service acquiring, on request, difficult material from foreign sources.

But requests may take many forms. In earlier years, PANSDOC received many requests for translations and eventually recruited a team of in-house translators. This work has fallen off, but could easily revive. The Mission recommends that existing staff identified as translators be mainly re-deployed and that PASTIC create a register of free-lance scientist-linguists who are willing to undertake translations on a piece-work basis.

Similarly some of the requests received can best be answered by providing a selective bibliography of available material. PASTIC continues to provide such a service and it should undoubtedly be maintained.

Thus the list given earlier can now be expanded as follows:

9. the maintenance of a modest library;
10. the organization of a register of on-going research in Pakistan;
11. the preparation of directories of the information-user communities;
12. the maintenance of a referral and document-procurement service;
13. the maintenance of a register of translators and translation services; and

14. the maintenance of a bibliographic service.

To support the functions that have now been identified, PASTIC would need to develop a number of essential in-house services.

- executive office
- administrative support services
- editorial and publications services
- reprographic services (printing and microforms)
- mail-handling and document distribution.

The Mission believes that a number of items on the present PASTIC programme should be dropped or reduced. Some of these have already fallen into arrears. In particular the lists of Canadian patents seem to be of very little value, the "current contents" service should be put on to a more selective basis, and the programme planned for the collection of statistics on research and development should be transferred to the recently created Science and Technology Policy Cell in the Ministry of Science and Technology which, presumably, not only has easier access to this type of information, but is also the main consumer of any such information generated.

A possible manning-table is tentatively put forward as Annex IV to this report. As compared with manning-tables that have been drawn up in the past, we would like to draw attention to the stress that we place on the need to strengthen the professional staff of PASTIC and on supporting these with an adequate number of middle-level technicians.

As has been indicated previously, we recommend that PASTIC and the PakSTI-Network be given their terms of reference under the authority of appropriate legislation or decrees. Presumably PASTIC would be set up as a semi-autonomous agency reporting for administrative purposes to a designated Division of the Government of Pakistan. For programme direction, however, we propose that PASTIC continue to seek guidance from its Board of Governors, but that this Board should now be expanded to reflect the proposed expansion of PASTIC itself from a Centre dealing solely with the pure and applied sciences to one dealing with the social and economic sciences as well. The Board should be made up of very senior officials, probably at the level of Joint Secretary or Vice-Chancellor.

The Board would probably, however, meet infrequently and another mechanism would be needed to keep the activities of PASTIC under more constant technical review. For this purpose we suggest the creation of a Technical Advisory Panel, reporting to the Board, and composed of a small group (not more than eight or ten) specialists in information science. Some of these - but not all - might, in fact, be responsible officers from particular co-operating libraries.

At present PASTIC has a strong provincial office in Karachi, a smaller office in Lahore, and plans to establish offices in Quetta and Peshawar. The Karachi office retains much of the equipment and some of the collections of the former PANSDOC. We realize the value of liaison offices to interact with clients, particularly with reference to the proposed development-support service (Chapter 7), and to interact with co-operating libraries in the PakSTI-Network. However, we feel that these provincial offices should be held to the level of two professional officers and that the equipment, and possibly the collections, still in Karachi should be transferred to Islamabad. PASTIC, we believe, should have most of its staff and other resources in Islamabad.

The Mission is not in a position to calculate a "regular budget" for PASTIC, which could be more effectively done by Pakistani officials with ready access to salary scales, etc. An indicative salary budget could be deduced from the manning table offered in Annex II. The costs of materials and supplies, books and journals could be extrapolated from PASTIC's experience and revised in the light of the functions we have recommended. For grants to participating libraries, we suggest that an amount of \$200 000 (20 lakh rupees) be reserved annually. Given that we have questioned the need for creating a National Science Reference Library in PASTIC and proposed the establishment of a network of co-operating libraries viz, the PakSTI-Network, we believe that the Government is not likely to find our proposals any more onerous, and probably less onerous than those in the original PASTIC Project which has already been approved by the Government.

But the Mission does wish to point out that the PASTIC experience demonstrates that functions must be matched by resources. To define a programme beyond the means of the institution jeopardizes its credibility and throws its services in disrepute. The services of PASTIC, with some minor exceptions, were not ill-conceived. They were potentially of great value to Pakistan's development. Although we are now suggesting some radical revisions, these revisions reflect experiences in other countries, and we do not fault the proposals that were drawn up in

1957 and 1970: they were right at the time.

We appeal to the Government of Pakistan, if it accepts our proposals, to give PASTIC an assured and adequate budget for the functions that have been defined. If this is not possible, then the programme must be pruned as well.

Finally, we believe that PASTIC will be as good as its staff. It is not possible to know the potential of an individual at the time he is recruited. Every effort must be made to give the Director the flexibility to shift staff among jobs until each is in his most appropriate location. We recommend that, to aid this, a single set of job titles be designated for professional staff, and that individuals not be permanently classed as "cataloguer" or "bibliographer". We would suggest that all professional staff be designated as, say, "information officers" with, if necessary, adjectives to indicate the level of seniority. This would apply to PASTIC's present staff as well as to new recruits.

## Chapter 11

### THE NEED FOR EXTERNAL ASSISTANCE

The Mission has identified a number of weak points in the structure of PASTIC as it is now constituted. Some of these will need to be strengthened with external assistance, it being understood that such assistance will be of short duration and only for such time as is necessary to obtain replacements from Pakistan's own manpower and resources.

One of the major weaknesses is related to the general problem of management, and this has resulted in an under-utilization of the manpower and resources, albeit scarce, that have been provided by the Government. The proposals we have made will require the simultaneous development of several services, the efficient operation of which will determine the future of the PakSTI-Network. In the absence of local expertise in modern information system management, we feel that foreign assistance in this area is a vital necessity. International organizations, e.g., Unesco, organize short courses in information system management and several universities include this subject in their regular curriculum. The Director of PASTIC would benefit greatly from an opportunity to gain instruction in this field and to visit operational information systems performing services similar to PASTIC.

In Chapter 9 we have discussed in some detail the problem of the training of information specialists to meet the present and future needs of Pakistan. It appears to us that some of the future senior staff of the Centre, in addition to the Director, should be provided with fellowships to be trained for the specialized posts which they will occupy and for in-service training in or visits to corresponding institutions in more developed countries. A large part of this overseas training programme will be replaced in later years by a national programme of the type described in Chapter 9.

We have recommended the establishment of various units within PASTIC, and the Mission feels that it would be necessary to provide consultant services to some of these units, to advise on their establishment and development, to implement the required procedures, and to provide in-service training to the local staff. Unesco undertook to prepare a project proposal to cover these needs and, in the weeks following our Mission, assembled the document that we have reproduced in Annex VI in the form of a request for UNDP assistance.

As mentioned earlier, the non-availability of current scientific literature to serve the needs of research and

development is a cause of great concern to the Mission. While we have attempted to suggest means to improve the situation by schemes requiring the co-operation of a network of institutions and a rational organization of periodicals acquisitions to minimize duplication, such schemes will still not achieve the minimum level of coverage required to support scientific research and other development activities. We are aware that the foreign-exchange situation in this country will not permit a drastic increase in the expenditure on journals and that, therefore, an improvement in the situation is only possible through external assistance. We are also aware that the providers of external assistance are reluctant to contribute towards something which is a recurrent expense, such as the purchase of journals, in the fear that there would be no way of terminating such assistance without creating an awkward situation. The Mission feels, however, that this question should be carefully studied by those agencies responsible for external assistance and that every effort should be made to increase, through PASTIC, the literature resources of the libraries co-operating in the PakSTI-Network. As previously mentioned, PASTIC itself will be concerned mainly with secondary journals and will thus require to have a strong collection of abstracts and indexes. It will also need to have supporting literature such as dictionaries, encyclopaedias, directories, yearbooks, union catalogues, etc. The network libraries will need to have at least the key journals in their respective specialized fields as well as the abstracting and indexing journals relevant to the sectors for which they accept responsibility. The strengthening of the collections to ensure adequate coverage will require external assistance for some years to come. Many of the key journals will need to be available as a continuous series going back at least 10 years, and there will be many gaps to be filled in this respect.

When PANSDOC was set up in 1957, Unesco provided the necessary printing and reprographic facilities. Most of this equipment is still in service but will need to be replaced with more efficient and reliable equipment if PASTIC is to carry out the responsibilities designated for it by the Mission. External assistance for the procurement of the required equipment will be necessary, as governmental provision under this head is inadequate to meet all needs.

The Mission examined some of the possible sources of external assistance for the organization and development of PASTIC. One of the terms of reference of the Mission, was "to recommend on the content of proposals that the Government of Pakistan might formulate for technical assistance to strengthen the network". The Mission

examined the external inputs that would be required to set up and sustain a viable project over a period of five years, bearing in mind the need to minimize the financial requirements of any request to the UNDP in view of the heavy demand on the limited funds available from that Programme. Time did not permit the members of the Mission to draw up jointly a detailed project within UNDP specifications: this task was accepted by Unesco which, in the weeks following the completion of the Mission, prepared the document which is appended to this report as Annex VI. It should be borne in mind that, in the establishment of a project of this sort, a long initial period must be spent in building up a base - consisting of trained manpower, the minimum literature collections for providing services, and the equipment and the operational systems required for the interaction of these components. It will take time before results become clearly apparent but, even so, the investments must be closely monitored in the light of progress achieved; the Mission appeals for the exercise of flexibility and judgement so that during the life of the project, any necessary adjustments can be made to ensure maximum response to Pakistan's priorities in efficient information transfer.

As has been previously noted, the Mission welcomes the possibilities that are available of obtaining additional resources from bilateral donors for the development of the network. In particular, we have mentioned the possibility of obtaining assistance from the Netherlands Government under its Technical Assistance Programme. This Programme allows for the provision of experts and publications and, if at least a portion of the considerable sum still available is utilized immediately for the strengthening of the reference collection of PASTIC, its services could be greatly improved, even in the relatively near term. Since the expert could also be made available as early as 1977, his arrival should be co-ordinated with the delivery of the publications, to ensure that the improved services are initiated even before the UNDP project begins. The Mission strongly recommends that the Government of Pakistan develops, as a matter of urgency, its application to the Netherlands Programme for the purchase of reference publications and for expert services.

Other possibilities for external assistance for the building up of an expertise in computerized information processing have been outlined in Chapter 8.



## Chapter 12

### A BUILDING FOR PASTIC

The offices at present occupied by PASTIC in Islamabad are inadequate to house the staff and equipment now proposed. A new building will therefore be required. It is also the intention of the Chairman of the Pakistan Science Foundation that the various scientific organizations associated with the Foundation should be placed on the same site. PASTIC would form part of such a group.

No detailed architectural brief has yet been agreed for PASTIC or for any other buildings which are likely to be erected on this site. It is therefore thought important that any plan for the site should indicate a disposition of buildings which permits construction to take place over a number of years and in stages which it is impossible to determine at the moment. Neither the size nor the detailed building characteristics of any particular stage can be forecast now. All that can perhaps be said is that the bulk of the accommodation will consist of offices and that many of these will be small rooms rather than open undifferentiated space. This suggests certain building forms as being more appropriate than others.

#### The Site

The Pakistan science Foundation has bought a site on Constitution Avenue in Islamabad on which it is intended to house PASTIC and other groups related to the work of the Foundation. It is a corner site immediately north of Broadcasting House which is now under construction. Sites have been designated on the other side of the avenue for the National Library, the National Museum and the Pakistan Arts Council.

The site has a frontage on to Constitution Avenue of 570 feet and its area measures 5.54 acres. Expressed in square feet this represents an area of 243 500 sq.ft. The planning regulations of the Capital Development Authority allow a plot ratio of 1 : 1.2 for this site.

The total permissible gross area of the building is thus:

$$243\ 500 \times 1.2 = 292\ 200 \text{ sq.ft.}$$

Allowing 25% of this total for circulation, plant rooms, lavatories, etc., the net floor area is:

$$292\cdot200 - 73\ 050 = 219\ 150\ \text{sq.ft.}$$

Assuming an average occupancy of 150 sq.ft. per person the number which can be accommodated is:

$$\begin{array}{r} 219\ 150 \\ \hline 150 \end{array} = 1\ 460\ \text{persons}$$

Allowing that 50% of this area may be taken up by the storage of publications, by conference and seminar rooms, by workrooms containing machinery and reprographic aids, and possibly, by some hostel accommodation, the effective capacity of the site is about 700 office workers. On the available information this is likely to prove adequate for the whole of the Pakistan Science Foundation group, including PASTIC, for a very considerable time.

#### Characteristics of PASTIC

Three typical categories of space are likely to form the bulk of the accommodation:

1. offices
2. stacks
3. workrooms
4. teaching rooms

It is likely that by far the largest area will be taken up by offices. The number of these is to some extent indicated by the manning table given as Annex IV to illustrate the organization of PASTIC. Assuming a total staff of about 100, as suggested, and providing an average floor area of 150 sq.ft. per person, this gives an area of 15 000 sq.ft. for offices.

Library stack areas will be needed for the Pakistani research material collected through the work of the national inventory, for the books and periodicals related to the work of PASTIC and the periodicals not yet placed in the libraries of the PakSTI-Network.

In addition to this it may be thought advisable to have a very small library of essential scientific publications which relate to the work of those organizations associated with the Pakistan Science Foundation that also have offices on the same site. It would seem sensible to have such material serviced and stored by PASTIC using its facilities to provide a general service. This area would also include space for a small number of readers.

The total size of such holdings is likely to be 30 000 volumes. This suggests a floor area of 2 000 sq.ft.

The workrooms will deal with the reproduction of material, with the printing of certain publications and with the handling of incoming and outgoing mail. A reasonable estimate of the area required might be 1 500 sq.ft.

It is suggested that some common conference facilities - meeting rooms, simple catering arrangements and perhaps some residential accommodation - should be provided for the entire group of organizations on the site.

The PASTIC building will therefore only need a few spaces to deal with the teaching that is very intimately related with its day-to-day functions. What is likely to be needed is a meeting room for about 25 and a seminar room for 15. The area of these two rooms will be about 500 sq.ft.

The total floor area of the buildings is likely to be:

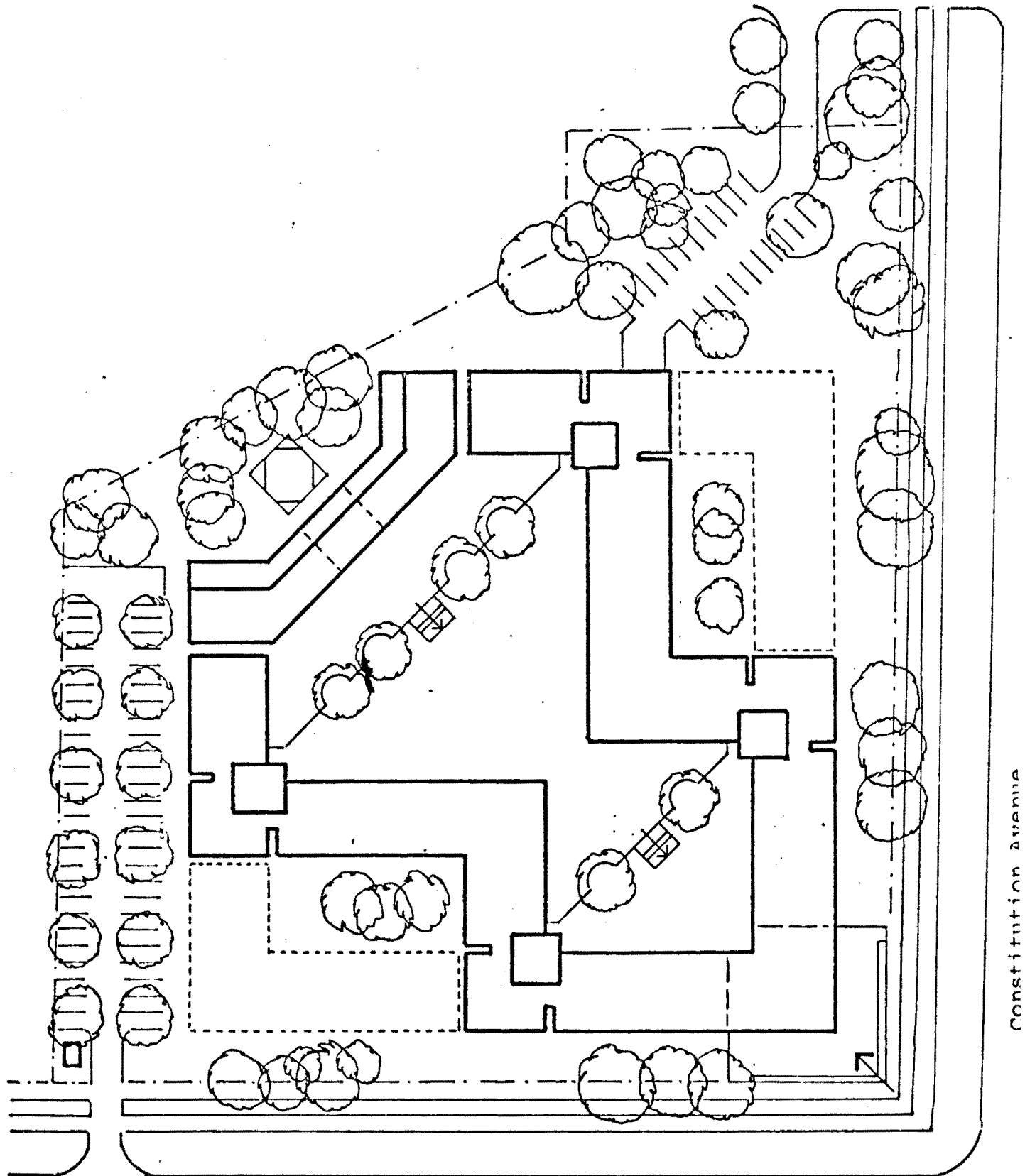
Offices .....	15 000
Stack Space .....	2 000
Workrooms .....	1 500
Teaching Rooms .....	500
	-----
	19 000
Adding 33% for circulation, services, lavatories, etc. ....	6 300
	-----
Total	25 300
Say	25 500

## Proposals

A site plan at a scale of 1 : 1 000 showing a suggested layout of buildings is attached. A diagram of building units is also shown which is intended to demonstrate how the buildings could be staged and how, after the initial programme of units adjacent to a central spine has been completed, each building has two points from which to expand still further. The intention is to build up a group of connected buildings

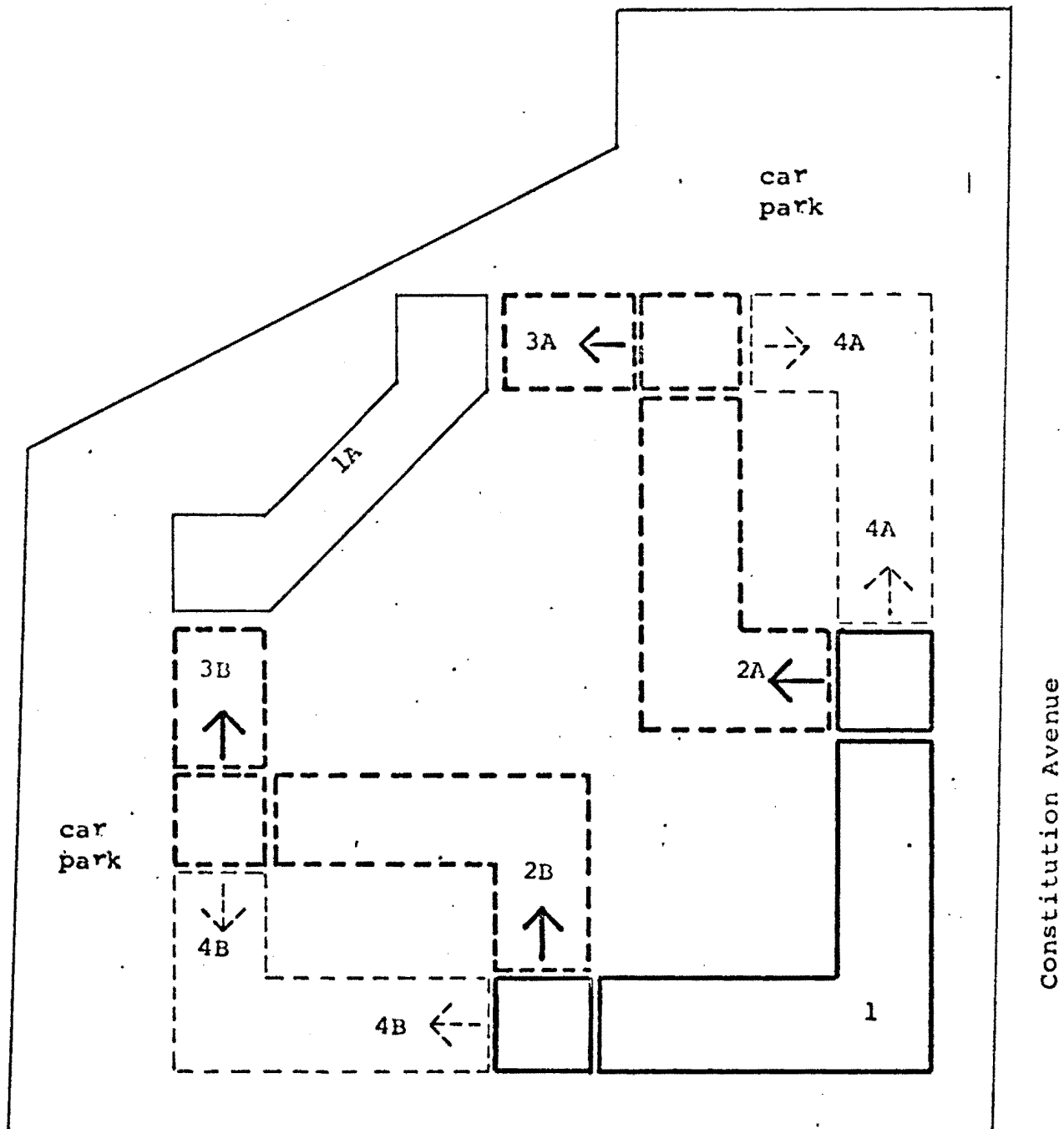
each of which is quite small so that the increments by which the project grows can also be kept small.

It ought to be emphasized that these diagrammatic proposals are based on very preliminary studies. When the Government of Pakistan has accepted the proposals being put forward for PASTIC and its associated network, or modified these, it will be possible to define an accurate brief in terms of numbers of staff, of books and periodicals and of reprographic machinery and thus to arrive at the spaces required for the various functions of the centre.

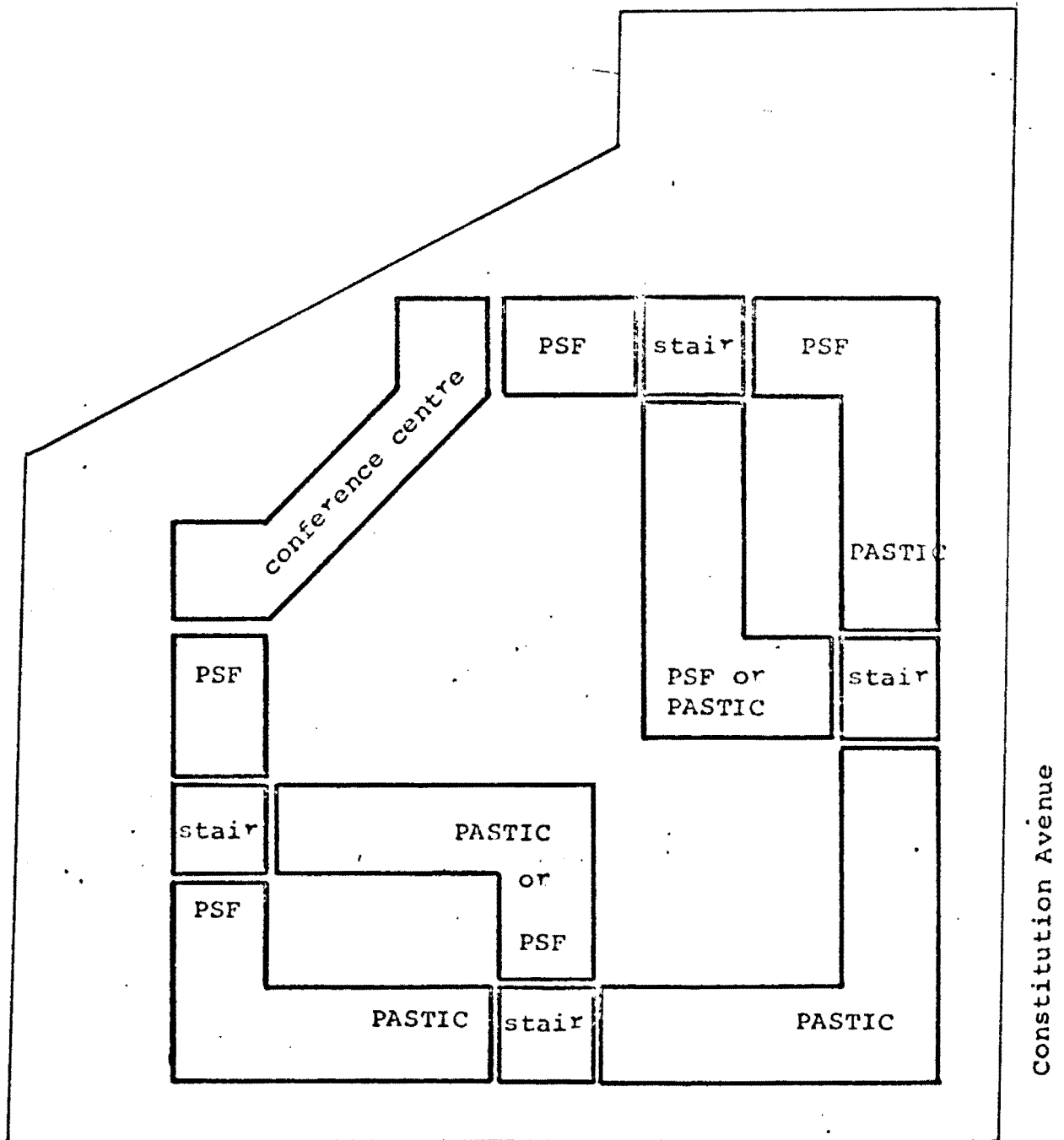


PASTIC & PSF Islamabad  
site plan at end of stage 3

scale: 1:1000  
November 1976



→ first line of expansion  
 - - - - - second line of expansion

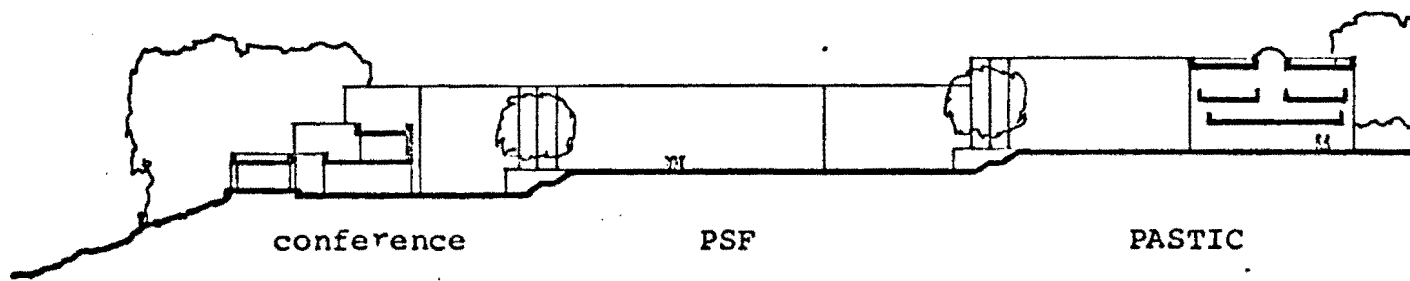


PASTIC & PSF Islamabad

site plan at final stage of development  
showing possible allocation of buildings

scale: 1:1000

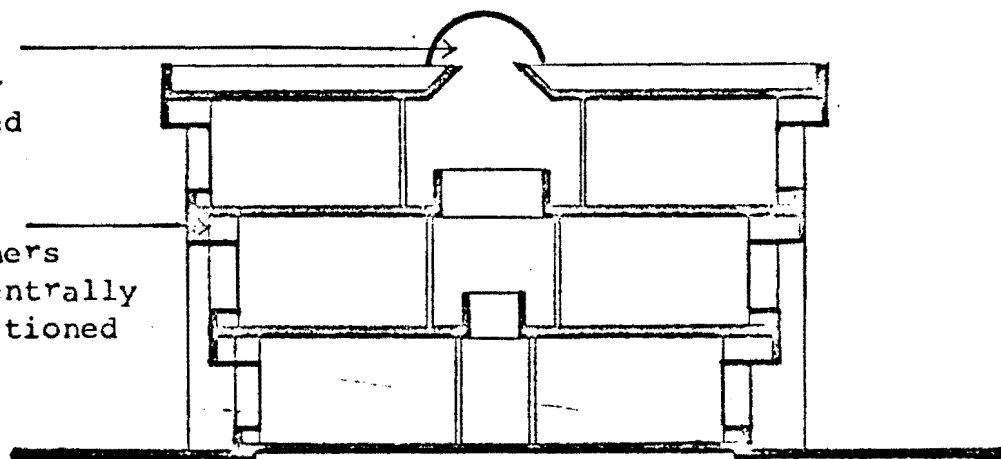
November 1976



east-west section across site

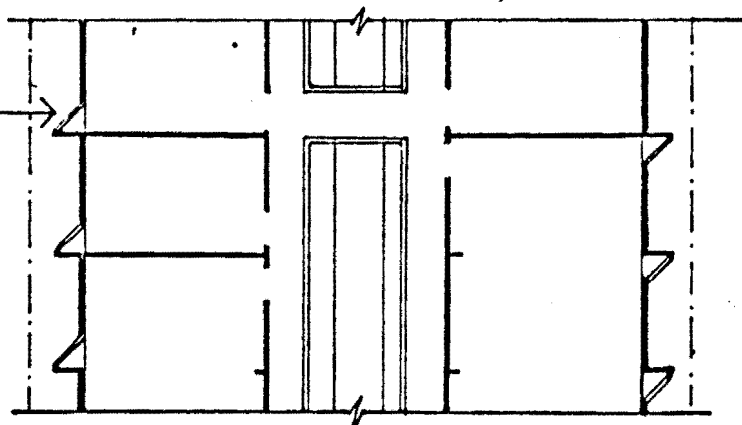
light &  
air if  
naturally  
ventilated

room air  
conditioners  
if not centrally  
air-conditioned



cross-section through typical building

windows angled  
for  
shading in view  
of position  
on site in rela-  
tion to orien-  
tation



part plan of typical building



## Annex I

### TERMS OF REFERENCE AND MEMBERS OF THE MISSION

The terms of reference of the Mission were agreed in advance between IDRC and Dr. Z.A. Hashmi, the Chairman of the Pakistan Science Foundation:

1. review data on available scientific and technological information sources, particularly in the areas of science and technology, health, industry, agriculture, statistics, development, economics and any other subject areas as may be desirable;
2. review data on existing computer facilities in Islamabad and available software packages in order to determine the capacities available in short and medium term for automation in the Pakistan national information network;
3. review the categories of prospective users to be served by the proposed network;
4. consider the optimum degree of networking among the various institutions to ensure maximum service to the prospective users;
5. identify the specific services that the network and especially PASTIC, should seek to continue or create;
6. identify the optimum methodologies to provide the required services;
7. evaluate the existing state-of-the-art and the development needed to achieve (6);
8. advise on an institutional structure for PASTIC and its relation to other institutions in the network;
9. offer, as far as possible, specifications and priorities for the various activities to be conducted in the network generally and particularly in PASTIC;
10. advise on the human resource development program needed for the proper implementation of the network;

11. advise how PASTIC should carry out its responsibilities for national and international co-ordination of information activities;
12. prepare a report (this report may be combined with the report that the UNDP's architect will be making on the building needed for PASTIC); and
13. recommend on the content of proposals that the Government of Pakistan might formulate for technical assistance to strengthen the network.

The Members of the Mission were:

Financed by IDRC

Mr. Shahid Akhtar, IDRC  
Mr. Paul Ghelardoni, UNIDO  
Mr. Sultan Kassum, IDRC  
Mr. L. E. Samarasinghe, Unesco  
Mr. John E. Woolston, IDRC

Financed by UNDP (Unesco)

Mr. Michael Brawne, University of Cambridge

The Mission commenced its work in Pakistan on 20th October, 1976, and left on 5th November, 1976. The Mission's programme while in Pakistan and a list of persons contacted during its stay are detailed in Annex II.

## Annex II

### INDIVIDUALS/ORGANIZATIONS VISITED AND THE MISSION'S PROGRAMME

#### ISLAMABAD

##### PAKISTAN SCIENCE FOUNDATION

Dr. Z. A. Hashmi, Chairman  
Mr. G. Murtaza Gilani, Secretary  
Mrs. Shaheen Khan, Senior Scientific Officer

##### SCIENTIFIC AND TECHNOLOGICAL RESEARCH DIVISION

Mr. Malik Mohammad Jafar, Minister for State,  
Science and Technology  
Mr. Manzoor Ahmad Sheikh, Secretary  
Dr. Altaf Hussain, Assistant Scientific Advisor  
Mr. Abdul Qayyum Khan, Assistant Scientific Advisor,  
Science Policy Cell  
Mr. Hasan Nawab, Joint Secretary

##### AGRICULTURAL RESEARCH COUNCIL

Mr. Aslam Ghayur, Deputy Director General  
Dr. Azim Barya, Deputy Director General  
Mr. Muzaffar Hussain, Agricultural Publications Officer  
Mr. Mushtaq Ahmad, Senior Documentation Officer

##### ECONOMIC AFFAIRS DIVISION

Mr. Aftab Ahmad Khan, Secretary

##### QUAID-E-AZAM (ISLAMABAD) UNIVERSITY

Mr. Amanullah Khan, Director, Computer Centre  
Mr. A. M. Naushahi, Systems Analyst, Computer Centre  
Mr. J. I. Khan, Analyst - Programmer, Computer Centre  
Dr. Fahim Hussain, Chairman, Department of Physics  
Mr. Mohammad Sarwar Khan, Assistant Librarian  
Mr. M. Rashid, Assistant Librarian  
Mr. M. H. Shahid, Librarian, Department of Biology  
Dr. Hashim Khan, Vice-Chancellor

PAKISTAN INSTITUTE FOR NUCLEAR SCIENCE AND TECHNOLOGY  
(PINSTECH)

Dr. Abdullah Sadiq, Senior Scientific Research Officer  
Mr. Kamaruddin Khurshid, Senior Librarian

PAKISTAN INSTITUTE FOR DEVELOPMENT ECONOMICS (PIDE)

Dr. M. L. Qureishi, Director  
Mr. Akhtar H. Siddiqui, Senior Librarian

NATIONAL HISTORY COMMISSION

Mr. Mohammad Anwar, Librarian  
Miss Atiya Abbas, Librarian

PLANNING AND DEVELOPMENT DIVISION

Mr. V. A. Jafarey, Secretary  
Dr. Masuda Akhtar, Deputy Chief, Economic Research Division  
Mr. M. I. Khursheed, Assistant Chief Librarian  
Dr. J. Hamid, Chief, Economic Research Division

CENTRAL BUREAU OF EDUCATION

Mr. S. Neaz Ahmed, Specialist (Documentation)

NATIONAL BOOK FOUNDATION

Dr. A. R. Malik, Director

MANPOWER DIVISION

Mr. Sirajuddin Ahmed, Deputy Chief, Manpower Institute

DEFENCE SCIENCE AND TECHNOLOGICAL ORGANIZATION (DESTO)

Dr. A. R. Qazi, Principal Research Officer

IRRIGATION, DRAINAGE AND FLOOD CONTROL RESEARCH COUNCIL

Mr. M. Anees, Secretary

FINANCE DIVISION

Mr. Khalid Mahmood, Engineer, Appropriate Technology Cell

INDUSTRIES DIVISION

Mr. S.M.A. Ashraf, Additional Secretary

USIS

Mr. S. I. Ali, Librarian (and Vice-President PLA)

UNDP

Mr. Jacob Everts, Resident Representative  
Mr. H. C. von Sponeck, Deputy Resident Representative  
Mr. Henning Karcher, Programme Officer

PAKISTAN COMPUTER BUREAU

Dr. Mushtaq Ahmed, Deputy Director

UNITED BANK COMPUTER CENTRE

Mr. Said Anwar, Second Vice-President

CAPITAL DEVELOPMENT AUTHORITY

Mr. Iqbal Javed, Deputy Director, Department of Architecture

PAKISTAN NATIONAL HEALTH LABORATORIES

Colonel M. I. Burney, Director

PAKISTAN ACADEMY OF SCIENCES

Dr. Raziuddin Siddiqui, Chairman

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION  
CENTRE (PASTIC)

Dr. A. R. Mohajir, Project Director  
Mr. Hamid Khan, Senior Documentation Officer  
Miss Mumtaz Begum, Senior Bibliographic Officer

Miss Shameem Farrukh, Translating Officer  
Mrs. Sultana Akhtar, Documentation Officer

#### UNIVERSITY GRANTS COMMISSION

Dr. M. D. Shani, Member  
Mr. Ahmad Ali Qureishi, Publications Officer  
Mr. S. M. Hassan, Deputy Director, Planning and  
development  
Mr. Humayun Tajir, Deputy Director  
Dr. Ejaz Malik, Advisor  
Dr. R. A. Arain, Deputy Director

#### LYALLPUR

##### LYALLPUR AGRICULTURAL UNIVERSITY

Dr. A. G. Kausar, Director of Research  
Mr. Najaf Ali Khan, Librarian  
Mr. Shabbir Hussain, Registrar  
Professor M. Aslam, Chairman, Department of Soil Sciences  
Professor Mohammad Rafiq, Chairman, Department of Entomology  
Dr. Niaz Ali, Chairman, Department of Horticulture  
Dr. Jamil Ahmad Qureishi, Faculty of Animal Husbandry  
Dr. Mahmood Ali, Dean, Faculty of Agricultural Economics  
Dr. A. Rahman, Chairman, Department of Plant Breeding and  
Genetics  
Dr. Akram, Department of Social Sciences and Humanities

#### LAHORE

##### PAKISTAN INDUSTRIAL TECHNICAL ADVISORY CENTRE (PITAC)

Brigadier M. A. Faruqi, General Manager  
Mr. M. A. Jabbar Khan, Chief of Operations

#### UNIVERSITY OF PUNJAB

Dr. Mumtaz Anwar, Acting Librarian  
Mr. Bashir Ali Khan, Chairman, Department of Library Science  
Dr. M. A. Shaukat, Head, Department of Physics

#### PAKISTAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (PCSIR)

Dr. Yusuf Ahmad, Director  
Mr. Iftikhar Ahmad, Senior Research Officer

#### PAKISTAN LIBRARY ASSOCIATION (PUNJAB BRANCH)

Mr. Osman Danish, Secretary (Librarian, Administrative  
Staff College)  
Mr. Sher Afghan, Treasurer

#### NATIONAL DESIGN AND INDUSTRIAL SERVICES CORP. LTD.

Mr. Mohammad Latif, Chief Statistician

#### WATER AND POWER DEVELOPMENT AUTHORITY (WAPDA)

Mr. Khalid Saifullah, Director, Standards and Research

#### PASTIC SUB-CENTRE (LAHORE)

Mr. N. Humayun, Officer-in-Charge

#### ENGINEERING UNIVERSITY

Dr. Mujahid, Liaison Officer  
Mr. Fazlul Haque, Librarian  
Dr. Zaheerul Haque, Dean, Faculty of Engineering  
Dr. M. Altaf Ali Qureshi, Chairman, Electrical Engineering  
Dr. Z. M. Khilji, Chairman, Civil Engineering  
Dr. Sultan Hussain, Chairman, Mechanical Engineering  
Dr. F.A.K. Kirmani, Chairman, Mining Engineering  
Dr. A. H. Bandey, Chairman, Department of Engineering  
Dr. Saleem Shuja, Chairman, Metallurgical Engineering  
Dr. Riaz Hussain Mirza, Chairman, Architecture  
Mr. Sardar Hamid Lateef, Chairman, Town Planning  
Dr. Qamar Iqbal, Chairman, Department of Chemistry  
Syed Mukhtar Hussain Shah, Chairman, Department of Mathematics  
Mr. Mohammad Iqbal, Chairman, Department of Physics  
Mr. S. A. Rashid, Manager, Data Processing Centre

## KARACHI

### STATE BANK OF PAKISTAN

Dr. Mohammad Hussain, Deputy Director, Statistics Department  
Mr. Syed Riazuddin, Librarian

### PAKISTAN INDUSTRIAL CREDIT AND INVESTMENT CORPORATION (PICIC)

Mr. Fazal Bari, Chief Engineer  
Mr. Faruqui, Engineer

### CHAMBER OF COMMERCE AND INDUSTRIES

Mr. Ali Mohammad Diwan, Senior Vice-President  
Mr. Shaikh Haroon Rashid, Vice-President  
Mr. Mohammad Rafiq, Vice-President

### PAKISTAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (PCSIR)

Dr. Arshad A. Baig, Principal Research Officer  
Dr. M. Anwarullah, Principal Research Officer  
Dr. G. Mustafa Ali, Principal Research Officer  
Mr. Jameel Ahmad Khan, Officer-in-Charge

### UNIVERSITY OF KARACHI

Dr. Ehsan Rashid, Vice-Chancellor  
Dr. Mahfooz Ali, Pro-Vice Chancellor  
Dr. S. Hamid Mahmood, Registrar  
Dr. Riazul-Islam, Dean, Faculty of Arts  
Dr. Kazi A. Kadir, Chairman, Department of Philosophy  
Dr. M. Tirmizi, Chairman, Department of Science  
Dr. Itefaq Ali, Professor, Botany  
Mr. Adil Usmani, Librarian

### JINNAH-POST-GRADUATE MEDICAL COLLEGE (JPMC)

Mr. Nazeer Ahmad, Librarian

### PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Mr. M. A. Haleem, Senior Editor



DEPARTMENT OF ARCHIVES, MINISTRY OF EDUCATION

Mr. Atique, Director  
Mr. Mohammad Siddiq, Deputy Director

DEPARTMENT OF LIBRARIES, MINISTRY OF EDUCATION

Mr. Abdul Hafeez Akhtar, Director

CONTROLLER OF PATENTS AND DESIGN

Mr. Mohammad Zafar, Assistant Controller

INVESTMENT PROMOTION BUREAU

Dr. Mohammad Ali, Director

SOCIETY FOR THE PROMOTION AND IMPROVEMENT OF LIBRARIES

Mr. Hakim Mohammed Said, President  
Mr. Mohammad Arifuddin, Secretary  
Mrs. L. A. D'Silva, Executive  
Justice Qadeeruddin Ahmad, Member  
Dr. Hafiz Mohammad Ilyas, Member  
Mr. Masarrat Hussain Zuberi, Member

PASTIC SUB-CENTRE (KARACHI)

Mr. Sanaul Haq, Officer-in-Charge  
Mr. Mohammad Nawaz, Technical Information Officer  
Mr. Zafar Ahmad, Technical Information Officer  
Mrs. Z. S. Haq, Senior Translating Officer

## MISSION'S PROGRAMME

Thursday, 21 October, 1976 (Islamabad)

- Meeting with the Secretary, Scientific and Technological Research Division and Chairman, Pakistan Science Foundation

Friday, 22 October, 1976 (Islamabad)

- Meeting with UNDP Resident Representative
- Meeting with the Director, Computer Centre, Quaid-e-Azam University
- Meeting with the Director, Pakistan Institute for Development Economics (PIDE)

Saturday, 23 October, 1976 (Islamabad)

- Meeting with the Representatives of the Pakistan "Scientists Team"
- Departure for Lahore/Lyallpur PK-613

Sunday, 24 October, 1976 (Lyallpur)

- Meeting with the Faculty Members of the Lyallpur Agricultural University

Monday, 25 October, 1976 (Lahore)

- Meeting with the General Manager, Pakistan Industrial Technical Advisory Centre (PITAC)
- Meeting with the Heads of the Departments of Library Science and Physics, University of Punjab
- Meeting with the Representatives of the PCSIR Laboratories in Lahore
- Meeting with the Faculty Members of the Engineering University
- Meeting with the Members of the Pakistan Library Association (Punjab Branch)
- Departure for Karachi PK-307

Tuesday, 26 October, 1976 (Karachi)

- Meeting with the Representatives of the State Bank of Pakistan
- Meeting with the Representatives of the Pakistan Industrial Credit and Investment Corporation (PICIC)
- Meeting with the Members of the Karachi Chamber of Commerce and Industries
- Meeting with the Members of the Society for the Promotion and Improvement of Libraries (SPIL)

Wednesday, 27 October, 1976 (Karachi)

- Meeting with the Director, Investment Promotion Bureau
- Meeting with the Representatives of various Pakistani Institutions based in Karachi
- Meeting with the Vice-Chancellor and Faculty Members of the University of Karachi
- Meeting with Representatives of the PCSIR Laboratories

Thursday, 28 October, 1976 (Islamabad)

- Departure for Islamabad PK-300
- Meeting with the Additional Secretary, Industries Division
- Meeting with the Representatives of the Pakistani "Policy and Planning Group"

Friday, 29 October, 1976 (Islamabad)

- Meeting with Pakistani Librarians and Information Specialists
- Meeting with the Representatives of the Planning Commission
- Meeting with Representatives of the Agricultural Research Council (ARC)
- Discussions with PASTIC National Centre Staff

Saturday, 30 October, 1976 (Islamabad)

- Meeting with the Representatives of the Computer Centre (Quaid-e-Azam University), PINSTECH, PIDE, and ARC
- Meeting with the Director, Architecture Department, Capital Development Authority
- Discussions with PASTIC National Centre Staff
- Meeting with the Members of the Pakistan Library Association (PLA)

Sunday, 31 October, 1976 (Islamabad)

- Free day

Monday, 1 November, 1976 (Islamabad)

- Return visit by the Computer Specialist to the Computer Centre, Quaid-e-Azam University
- Meeting and Discussions with the Members of the Governing Board of PASTIC
- Meeting with the Director, Pakistan Computer Bureau, Government of Pakistan
- Meeting with the Second Vice-President, United Bank Ltd., Computer Centre

Tuesday, 2 November, 1976 (Islamabad)

- Meeting with the Secretary, Economic Affairs Division
- Meeting with the Minister of State for Science and Technology

Wednesday, 3 November, 1976 (Islamabad)

- Visit to the Planning Commission's Library
- Meeting with the Representatives of the University Grants Commission
- Meeting with the Vice-Chancellor, University of Quaid-e-Azam

Thursday, 4 November, 1976 (Islamabad)

- Meeting with the First Secretary, Embassy of the Netherlands

Friday, 5 November, 1976 (Islamabad)

- Meeting with the Secretary of the Planning Commission
- Meeting with the Secretary, Scientific and Technological Research Division

### Annex III

#### HISTORY AND BACKGROUND OF PASTIC

As far back as 1955, the Government of Pakistan invited, under the Colombo Plan, Mr. L. C. Key, Deputy Librarian of the National Library of Australia as a consultant in order to survey the library situation in the country and submit proposals for the establishment and improvement of library services in Pakistan. Mr. Key submitted his report in August 1956 in which he touched upon the need for strengthening scientific libraries, particularly those attached to the laboratories of the Pakistan Council of Scientific and Industrial Research (PCSIR).

In 1956 the Ministry of Education approached Unesco to conduct a feasibility study with regard to the establishment of a National Documentation Centre in the country. A Unesco adviser, Mr. A. L. Gardner, was sent to Pakistan in 1956 to conduct a survey of the resources available for the development of such a centre. He submitted his report to the Ministry of Education.

The report included, inter alia, a recommendation for the establishment of a Pakistan National Scientific and Technical Documentation Centre (PANSDOC). The Ministry of Education, on the recommendation of the Unesco Adviser, devolved the responsibility for the PANSDOC Project to the Ministry of Industries, which in turn requested PCSIR to establish PANSDOC under its administrative control. PCSIR established PANSDOC in early 1957 with Unesco's technical assistance. The assistance provided by Unesco was in the form of advisory services, equipment and fellowships. It was made available for a period of five years. In September 1960, the Pakistan National Science Commission recommended that the collection of scientific books and journals in Pakistani libraries, import facilities, inter-library loans of books and journals, procurement of and preparation of microfilms and photocopies of published papers and documents, preparation of bibliographies and translations into English of important scientific papers and a provision for an inventory of key researches and scientists in the country should all be up-dated to meet the needs of the country. They also recommended that PANSDOC should be placed under the National Science Council and that branches be established in Lahore and Dacca. Again the "Second Five Year Plan 1969-65" spelled out these problems in a note entitled "Special Libraries". It recommended that services be accompanied by the pooling of reference materials through inter-library loans, union lists and catalogues and co-operative bibliographical work. The plan also stressed the need to develop special libraries.

On the international level, the Unesco Seminar on Scientific Documentation in South and South East Asia held in New Delhi, in March 1961, unanimously adopted the following resolution (Proposal No. 5) for consideration of the Participating Governments.

"The attention of the governments is drawn to the importance of developing in each country libraries with large collections of scientific literature as an essential basis for documentation services; and to the value of developing documentation services within these libraries themselves."

Ever since its establishment PANSDOC remained in close touch with the scientific and technical libraries of the country and in most cases found their stocks inadequate for the basic requirements of the institutions concerned. In order to devise ways and means for improving scientific library services, PANSDOC organized a symposium in March 1963 on the Development of Scientific and Technical Libraries in Pakistan. The symposium recommended (Resolution number 1) that central science libraries be developed in both East and West Pakistan in order to cater to the needs of the institutions engaged in scientific teaching and research, and PANSDOC was charged with the task of developing these central science libraries in order to build up and develop a reference collection of world literature covering all fields of science and technology and answering the present and future requirements of the entire scientific community.

PANSDOC submitted a project to the PCSIR for the establishment of a Science Library and Information Service in Pakistan in 1963. The proposed project was so constructed that the libraries could, even during their period of growth, become a nucleus for the efficient and continued development of an integrated pattern of scientific library services throughout the country. The project was approved by the Ministry of Industries and was further submitted to the Planning Commission for incorporation in the Third Five Year Plan in 1964.

While this project was under consideration, Unesco was approached to provide the services of a short-term consultant in order to examine the project and advise the Government on appropriate action. The consultant, Dr. Herman H. Henkle, submitted his report in August 1966 after thoroughly examining the situation in both East and West Pakistan. Some of the recommendations made in this report were that early action should be taken for the assignment of responsibility to PANSDOC for developing National Science Libraries; that the Government of Pakistan make a drastic re-appraisal of its financial support for scientific and technical libraries and,

through them, for its supply of scientific and technical information; that all restrictions on the use of foreign exchange for purchase of scientific and technical publications by the government-supported educational and research organizations be removed. He further proposed that a national system of libraries be established at Islamabad and Dacca consisting of a Science and Technology Library, a Health science Library, an Agricultural Library, and an Industrial Library under the Central Directorate of National Science Libraries and Information Centres, along with the then PANSDOC and a regional Industrial Library at Karachi.

On the basis of the above recommendation a project was submitted to PCSIR in March 1968 entitled "Development of National Science Library". This project was revised in 1970 and incorporated into an overall plan for the expansion of PANSDOC into a National Scientific and Technical Information and Statistical Centre to be implemented in the country's Fourth Five Year Plan period 1970-75.

The project for the Establishment of the Pakistan Scientific and Technological Information Centre (PASTIC), was a modification of the 1970 project and was prepared on the basis of the guidelines given by Dr. I.H. Usmani, Secretary, Ministry of Science and Technology, who set up a committee headed by Dr. V.G. DeSa, Member Technology, PCSIR, for this purpose. The basic aim of the project was the development of a minimum viable base of scientific literature resources and the provision of effective scientific and technological information transfer services as an infra-structure for scientific research activities, as well as industrial and technological development in the country.

Pursuant to this objective, the plan envisaged the development of PASTIC based on the existing nucleus of PANSDOC with the following facilities:

1. National Scientific Reference Library.
2. Scientific and Technological Information Transfer Services.
3. Documentation Services (as existing in PANSDOC).
4. Facilities for compilation of R&D Statistics.
5. Scientific publications facilities.

The capital expenditure on the entire project was estimated to be Rs.10.1 million over a period of 5 years. The total recurring expenditure during the same period was Rs.11 million plus PANSDOC's annual allocation of



Rs. 740,000. The annual recurring expenditure of Rs.11 million was not included in the project estimates.

In the PASTIC project, it was envisaged that the possibility of foreign-exchange financing of scholarships, library materials, reprographical equipment, expert services under Unesco, UNIDO, the Colombo Plan and Cento, as well as bilateral agreements with countries such as the USA, the UK, Germany and Japan would be explored. In view of this, the Pakistan Science Foundation initiated a proposal early in 1975, through the Government of Pakistan, for UNDP assistance to PASTIC. The Government officially forwarded the proposal to the UNDP in June 1975 requesting UNDP assistance for the project. The request was entirely consistent with the recommendations of Unesco's UNISIST programme which has sought to assist countries with the definition of national information networks. However, in view of the complexity of the project and the delays that had been experienced in implementing it, the UNDP felt that it might be appropriate to start off with a consultancy mission which would survey the existing scientific and technical information services in the country and advise on the institutional framework for the PASTIC Project.

Early in 1976, following discussion between UNDP, Unesco, the International Development Research Centre (IDRC) of Canada and other international bodies, it was agreed that IDRC would finance the foreign component of the consultancy mission and appoint a five-person team from its own staff, Unesco, and UNIDO. It was further agreed that the UNDP would meet the specific request from the Government for an architect to advise on the building needs of PASTIC. The Government agreed with the need for a consultancy mission and approved the cost-sharing formula proposed by the UNDP, Unesco and IDRC.

## Annex IV

### ILLUSTRATIVE MANNING TABLE FOR PASTIC

(Estimates of staff needed three years after the establishment of the PakSTI-Network)

NOTE: The Mission is very reluctant to suggest grades for the positions in this illustrative manning table (from which peons are omitted). We are obviously unable, because of our unfamiliarity with the Pakistani Civil Service, to offer specific advice on these matters. However, we felt that it was necessary to indicate approximate grades to correspond to responsibilities and authorities. These will need review by the competent bodies in the Government, which should also consider whether the stenographic and typing staff should be distributed as indicated or grouped in a pool.

1. Director's Office	Grade
Director	20
Executive Assistant	17
Stenographer	12
Typist	11

#### 1.1 Policy-Development Unit

(a) Specialist in international information policy: preparation of position papers for Pakistani delegations to international agencies and conferences	19
Routine international liaison (e.g. UNEP/IRS)	16
Stenographer	12
(b) Specialist in domestic information policy: surveys of needs and resources of Pakistani institutions; Secretariat for UNISIST national committee	18
Typist	11

#### 1.2 Network Co-ordination Unit

(a) Chief Liaison Officer with co-operating institutions and Head of this Unit: co-ordination of acquisitions policy and administration of grants to network libraries	19
--	----

Officer on network tools (inter-library loans and photocopy supply procedures, possible national coupon system)	16
Stenographer	12

(b) Manager for union list of journals:	
directories of users	17
Clerk-typist	13

### 1.3 Training Unit

Co-ordinator	18
Stenographer	12

### 1.4 Regional Sub-offices

Liaison with users and with co-operating libraries in the provinces of Pakistan: output of Development-Support Unit (for example, through Chambers of Commerce and industrial associations)

Two professionals in each regional office viz Karachi, Lahore, Quetta and Peshawar	8 x 18
Assistants	4 x 16
Stenographers	4 x 12

## 2. National Inventory of Pakistani Information

(a) Manager of on-going research information system	18
clerk-typist	13

(b) Manager of Pakistan documents and periodicals indexes	18
Abstractors and indexers	3 x 16
Clerk-typists, terminal operators	3 x 12
(Note: clearing-house functions are carried out by unit 4.)	

## 3. Library

Note: The periodicals collections will be limited to three main areas: (1) the secondary (abstract and indexing) journals needed by the bibliographic unit, (2) the primary journals in information science, (3) the national collections in those subject areas

that have not yet been devolved to appropriate libraries co-operating in the PakSTI-Network.

The documents collections will be mostly of Pakistani material comprehensively collected to provide the national inventory (see unit 2).

Normal library functions of acquisition, exchange, cataloguing, shelving and binding will be covered by this unit, leaving reference work, inter-library loans and photocopying to be managed by units 4 and 6.

Manager	18
Periodicals	16
Document Acquisitions	17
Catalogues	16
Library Technicians	2 x 15
Clerk-typists	2 x 14
Typists	11
Attendants	3 x 5

#### 4. Clearing-House, Referral Service and Document-Procurement Unit

Based on the National Inventory of Pakistani Information, the union catalogue and the secondary services available in the PASTIC Library, this unit would be responsible for responding to enquiries from users. Where appropriate, items would be referred to the Translations or Bibliographic Units. Many enquiries would be referred to co-operating institutions in the PakSTI-Network. When necessary, foreign documents would be procured from overseas. This unit would be the principal source of orders on the photocopying unit and the principal initiator of inter-library loans.

Manager	18
Staff	3 x 15
Typists	2 x 11

5. Translations Unit

Manager - translator - reviser	18
Reviser	16
Typists	2 x 11

(Note: the bulk of the translating will not be carried out by full-time staff, but will be done on a piece-work basis by scientists-linguists who register with PASTIC.)

6. Bibliographic Unit

Bibliographer	18
Assistant	16
Typist	11

7. Development-Support Unit

Information is a resource for development, but only if it is offered in a form that can be assimilated by the user. Much of the information available today is written by specialists in a language and at a level that cannot be understood by entrepreneurs and other personnel, particularly in small and medium-scale industries. The interpretation of this material requires a combination of technical knowledge and journalistic skill. While some of this work may be done by the provincial liaison staff (unit 1.4), there is a need for a strong resource team in PASTIC itself.

Specialists	2 x 18
Stenographer	12

8. Data-Processing Unit

The first principal computer applications to be undertaken by PASTIC are for the on-going research information system and the National Inventory of Pakistani Information. But PASTIC will also need to maintain

an awareness of data-processing development and be in a position to advise on applications throughout the PakSTI-Network. Close co-operation will be maintained with the proposed work at Quaid-e-Azam University, thus allowing PASTIC to rely on the team there as its principal source of consultants.

Manager	18
System Analyst	17
Programmer	16
Chief Operator	16
Keyboard Operator	12
Typist	11

## 9. Technical Support Services

### 9.1 Editorial and Publications

Editor	18
Graphics	16
Typist	12

Note: The Mission feels it would be misleading to give estimates of the number of staff needed for sub-units (9.2) and (9.3), as employment should directly respond to needs as they occur; undoubtedly, however, PASTIC will need strong teams in these sub-units if its work is not to be frustrated by delays.

### 9.2 Reprography (including microfilms and printing)

Manager	18
Other staff (see note above)	

### 9.3 Mail Handling and Distribution of Documents

Manager	17
Other staff (see note above)	

#### 10. Administrative Support Services

The Mission is conscious of its ignorance of Pakistani procedures for personnel administration, accounting, etc. It believes that PASTIC should have adequate staffing to enable it to work speedily and with flexibility in these areas, subject only to general direction and review by higher authorities.

The total number of staff in the professional, technical and clerical grades, omitting those in the technical and administrative support services, is as follows:

Grade	Number
20	1
19	2
18	21
17	5
16	16
15	5
14	2
13	2
12	14
11	9
5	3
	-----
Total	80

We would imagine that the eventual number of staff three years after the acceptance of this report would be just over 100. We would suggest that this would be a realistic number on which to base the calculations for any new building.

## Annex V

### AN EXPERIMENTAL PILOT PROJECT TO GIVE EXPERIENCE IN HANDLING BIBLIOGRAPHIC INFORMATION ON COMPUTERS (PROJECT DURATION: 2 YEARS)

In Chapter 8, the need for setting up an experimental pilot project has been expressed. In this Annex we indicate in broad terms the objectives, methodology, financial support and manpower requirements for this project.

#### Objectives:

- a) To introduce modern information-handling techniques to Pakistan by using available data-processing equipment;
- b) To allow the software personnel at the Quaid-e-Azam University to obtain experience in automatic procedures to handle bibliographic information;
- c) To allow full exploitation of international data bases (INIS for atomic energy and AGRIS for agricultural research and technology) and implementation of Selective Dissemination of Information (SDI);
- d) To allow a selected number of organizations to build their own data bases consisting of conventional and non-conventional literature produced in Pakistan and internationally in the field of social and economic development; and
- e) To build a resource base on which PASTIC and the libraries co-operating in the PakSTI-Network can draw when they are ready to apply computer techniques to some of their operations.

#### Methodology

Four organizations will be selected to make use of available software for bibliographic data-processing (using, most probably, the ISIS programme package developed at ILO), which will be installed at the Quaid-e-Azam University. These organizations are PINSTECH for INIS-SDI service, ARC for AGRIS-SDI service, the Planning Commission's Documentation Cell and the Pakistan Institute of Development Economics for data-base construction, library management and retrospective searches on the social and economic development data



bases. PIDE is favoured to some extent to commence work on the building of a Pakistani data-base since it occupies the premises in Quaid-e-Azam University adjacent to where the computer (IBM 360/44 under DOS) is located. It is also the best equipped, especially in terms of staff, to launch such an experimental pilot project.

#### Atomic Energy Information Services

Because Pakistan is already participating in the IAEA International Nuclear Information System (INIS), it is entitled to receive in exchange the INIS tapes for its SDI service, although it has not used this facility so far.

Because Pakistan's input to the INIS system is prepared at PINSTECH, the training of the PINSTECH staff to prepare the profiles for SDI services would be a relatively simple task since they already have the basic knowledge of the INIS indexing methods and thesaurus. Subject to the Government of Pakistan's approval for PINSTECH to participate in the pilot project, it is possible that IDRC could assist (1) with the identification and implementation of appropriate SDI software at the Quaid-e-Azam computer and (2) with securing the necessary training of PINSTECH documentalists responsible for preparing profiles.

#### Agriculture Information Services

Although the Government of Pakistan has officially designated ARC as the AGRIS participating centre for Pakistan, ARC has not as yet started to provide Pakistani information to AGRIS or to exploit the AGRIS outputs. The delay is mainly due to the lack of trained documentalists in ARC.

For the ARC documentalists to be trained, ARC officials approached the Team Leader of this Mission, in his capacity as Director of the Information Sciences Division of IDRC, and requested IDRC assistance in convening a training seminar in Pakistan for this purpose. IDRC agreed to consult with FAO and to consider the provision of whatever assistance it could offer towards the training of ARC documentalists; to this end, it was also agreed that ARC would submit a project request to set up this seminar identifying the previous experience and qualifications of the individuals to be trained. When the documentalists are sufficiently trained and once ARC is ready to begin supplying AGRIS input, monthly AGRIS output tapes can be made available to Pakistan on the same basis that PINSTECH could receive the INIS output tapes. An SDI service for ARC and other agricultural-sciences institutes can then be initiated.

## The Planning Commission's Documentation Cell and PIDE

Both these organizations could use the ISIS software package for creating their own data bases, for library management, and then for information retrieval from their own data bases and, possibly also, from data bases to be obtained from ILO, IDRC, etc. The ISIS package, once installed, would allow these organizations, in a relatively short time, to gain considerable experience in the handling of information on computers.

## Project Proposal

To prepare a detailed description for this proposed project, a team of three managers (one from Quaid-e-Azam University, one from PIDE and one from the Planning Commission) should be identified to make a preparatory visit to Canada under the auspices of IDRC. This will allow the team members to obtain an overall picture of the capabilities and limitations of information-handling computer systems. The team members will also participate in drafting of the project proposal which could then be submitted to IDRC once the Government of Pakistan gives it its approval. At an appropriate time the Government of Pakistan would also need to secure the release of the ISIS software packages from ILO.

## Equipment and Manpower Requirement with Likely Assistance from IDRC

In principle, the likely assistance provided by IDRC for this project will be as follows:

### a) Quaid-e-Azam University

- Additional equipment for an on-line interactive facility (a keyboard visual display terminal);
- An upper and lower case print train;
- Salaries for one system analyst and one programmer during the duration of the project (estimated at two years); and
- Training of the system analyst and programmer.

### b) PIDE/Planning Commission

Computer time for the implementation and exploitation of the software packages.

It is understood that PIDE and the Planning Commission would need to provide the necessary cataloguers and terminal operators.

### Conclusions

All projects would be complete within two years during which time the Quaid-e-Azam University would have gained considerable experience in the implementation and operation of computerized bibliographic information processing systems. Early emphasis would be given to the SDI services for the exploitation of INIS and AGRIS data bases. The major undertaking, however, would be the use of ISIS for the PIDE Library and the Documentation Cell of the Planning Commission. Retrospective searches will be possible on the data bases created by these organizations and on the data bases procured from abroad. PASTIC and interested co-operating libraries in the PakSTI-Network would be able to follow this experience and then, as required, call on the University's knowledge and expertise before embarking upon the computerization of their own information-handling requirements.

## Annex VI

### PAKISTAN SCIENTIFIC & TECHNOLOGICAL INFORMATION CENTRE (PASTIC): A PROJECT PROPOSAL

The attached draft project document drawn up by Unesco is an attempt to reflect in a five-year project a number of activities designed to strengthen the Pakistan Scientific and Technological Information Centre so that it can play a national role in the research and development activities of the country. Simultaneously, action will be undertaken towards the establishment and development of a number of sub-networks, first in the form of pilot projects and later, through the expansion both in number and in coverage of scientific disciplines identified as being of interest to the country.

It is realized that the total of such local development will be insufficient to meet all information needs and in the final stage of the project action will be taken towards providing access to world sources of information through the utilization of techniques which are now being applied for information transfer in the more developed areas of the world.

In view of the rapid advances which are taking place in the field of information, it will be necessary that this project proposal be re-examined at the implementation stage so that it can be updated. Nevertheless, the basic problem of establishing PASTIC on a solid foundation where it will have adequately trained professional staff, a series of activities and services consonant with the requirements of users of information in the country and appropriate accommodation to house its services will remain the main objectives of the first phase of this project.

UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of PAKISTAN

PROJECT DOCUMENT

Title: Pakistan Scientific and Technological Information  
Centre (PASTIC)

Number: PAK/75/064/B/01/13 Duration: 5 years 2 months

Primary function: Institution-building project

Secondary function: Direct support project

Sector: Science and Technology (65)

Sub-Sector: Science and Technological Promotion (6510)

Government Implementing Agency: Ministry of Science and  
Technology through the  
Pakistan Science Foundation

Executing Agency: Unesco

Estimated starting date: October 1976

Government Inputs:

6 599 415

(Rupees)

(Rs 65.9 lakhs

in kind)

UNDP Inputs:

738 380

(US Dollars)

Signed: on behalf of the Government

Date

on behalf of the Executing Agency

Date

on behalf of the UNDP

Date

## PART I - LEGAL CONTEXT

"This Project Document shall be the instrument referred to as such in Article I, paragraph 1, of the Assistance Agreement between the Government of Pakistan and the United Nations Development Programme signed by the Parties on 25 February, 1960."

"The Government Implementing Agency shall, for the purposes of the Standard Basic Agreement, refer to the Government Co-operating Agency described in that Agreement."

## PART II - A - DEVELOPMENT OBJECTIVE

Information is considered to be an essential basis for the progress of civilization and society as well as a factor that plays a part in the processes of creation or consumption of wealth, as an indispensable ingredient in decision making, and as a fundamental resource which might even be compared to matter or energy. Being simultaneously the outcome of human activities and a necessary component of each of them, information is seen to be an ubiquitous factor which must be taken into account in the planning or taking of actions whose aim is economic, social and cultural development, in the widest sense.

The role of information in development was emphasized in the Seventh Special Session of the UN General Assembly in Resolution 3362 (S/VII) adopted unanimously: "Developed and developing countries should co-operate in the establishment, strengthening and development of the scientific and technological infrastructures of developing countries". In ECOSOC Resolution 9102 (LVII) developing countries are invited, as appropriate, "to establish or strengthen their scientific and technological information systems" and it further invites international financing organizations, particularly the UNDP, The IBRD and the Regional Development Banks and also developed countries to provide ways and means for supporting the organizations of the developing countries aimed at establishing and strengthening centres and services for scientific and technological information and systems for the transfer and assessment of technology.

The scientific and technological information system for Pakistan is seen as a necessary pre-requisite for all research and development activity in the country. The strengthening of the information resources, in particular those in the agricultural and industrial sectors, will have an impact on the development of these sectors, while the recommendation of the Mission, which studied the problem of scientific and technological information in Pakistan in October 1976, to provide within the national system, procedures for the re-packaging of information to facilitate its application in development in the rural areas, will also stimulate development activities.

The development objectives for the period 1975-1980 envisage improvement in living standards through the emphasis on better food, lodging and housing; improvement in public services through emphasis on education, transport and electrification; under distribution and employment; self sufficiency; import substitution and reforming the economic structure. These considerations

influence the sectoral programmes of the Government, which has established the following priority areas:

- (i) agriculture
- (ii) basic industries
- (iii) power and transport
- (iv) regional balance, and
- (v) social sectors

The project as envisaged is designed to provide services towards the attainment of all the development objectives listed above and to provide scientific, technical, economic and social information to the priority areas established by the Government and considered vital for the achievement of these objectives.

The information services to be provided through PASTIC will support research and development activities in all these sectors and provide a channel through which information on methods, techniques, standards, data and results of research and development activities undertaken in Pakistan and abroad could be transmitted to the planners, research workers and those directly involved in development activities.

The establishment of the PASTIC network, when realized, will provide these supporting services to all sectors, particularly to the agriculture and industrial sectors where there seems to be a vital need for it. An active research programme cannot be maintained without an information sector, a lack which has been commented upon particularly by Pakistani scientists and technologists. Further, extension services in agriculture and industry depend upon adequate information support and it is felt that the activity of these services can be improved through the presence of such an information system.



## PART II - B - IMMEDIATE OBJECTIVE

The immediate objective of this project is to set up a decentralized information system in which the Pakistan Scientific and Technological Information Centre (PASTIC) would play a major co-ordinating role.

The system, which will take the form of a network of co-operating institutions will be oriented towards performing the following functions:

- (a) to provide the Government agencies of the country, and the managers and planners involved, with detailed information about scientific and technical progress within the country and the prospect for its implementation;
- (b) to provide scientists, researchers and technicians with information concerning the latest published reports in their field of interest;
- (c) to provide an organization for the collection, processing and dissemination of national scientific findings in both the natural and social sciences and by this means improve communication among scientists within the country and lessen the possibility of duplication of effort;
- (d) to provide scientists within the country with a means of obtaining new scientific findings which originate in foreign countries;
- (e) to provide for the training of an adequate number of specialists and to provide for the training of scientists in the proper use of information.

These functions would be implemented by the performance of the following specific tasks within the network:

- (1) co-ordination of existing resources;
- (2) resource development;
- (3) services to users;
- (4) depository of scientific works produced in the country;
- (5) training of personnel.

Co-ordination involves the production of inventories or catalogues of available information resources within the country. These include:

- a union list of scientific and technical periodicals in the libraries of the network;
- a national register of scientific and technical personnel and their areas of expertise;
- a list of on-going research activities, etc.

It also involves the organization of the information resources of a number of widely dispersed institutions in a co-operating network designed to permit the flow of information from these institutions to users in all parts of the country.

PASTIC will acquire and assemble the following sources of scientific and technical information: bibliographies, reviews, abstracts, indexes, directories, encyclopedias, catalogues, etc. In other words, PASTIC should maintain a solid collection of reference tools to back up its scientific and technical books, conference proceedings, reports and other general materials. The services to be provided by PASTIC will consist of:

- (1) a document procurement service, which will obtain for a user a photocopy, microfilm or reprography of any published scientific article that may be requested;
- (2) a current awareness service, which will provide selected users with information on the literature published in their field of interest;
- (3) a translation service, which will provide the user with a complete translation or abstract, in a language understood by him, of any article which has been published in a language which he does not read;
- (4) an enquiry service, where requests for scientific information or answers to specific questions can be obtained from the centre; telephone, oral or postal enquiries will be dealt with;
- (5) a reprographic and printing service, where the equipment of the centre will be used for reproducing documents required by institutions or individuals. The methods used will be microfilming, printing, photo-offset or photocopying;
- (6) advisory services in the field of scientific and technical documentation to governmental and

technical institutions in the countries. The advice will be in the organization and maintenance of technical services, staff training, administration, etc.

- (7) library services, where reading facilities will be provided and where important technical works and books will be available to authorized users;
- (8) exchange services, where the publications of the centre will be exchanged with those of similar centres either within the country or abroad.

PASTIC will be a depository for all research papers, reports, reviews, surveys, etc., that are produced in the country, as a result of the work of learned societies, commercial or industrial firms, governmental departmentals, as well as of scientists and technologists. As much of this material is not published or listed, it tends to escape the attention of those working in similar or selected fields resulting in a waste of time, money and effort due to unnecessary duplication of work that has already been done.

Also, documents will be listed by PASTIC and perhaps included in selective state-of-the-art reviews. As regards training, PASTIC will undertake, with the collaboration of Quaid-e-Azam University, the setting up of a course for the training of information specialists. It will also organize courses for junior library staff and technicians and provide for the training of users of scientific and technical information.

## PART II - C - SPECIAL CONSIDERATIONS

The implementation of this project will facilitate and promote technical co-operation among the developing countries. The project will be oriented in accordance with the guidelines and objectives of the UNISIST Programme which is recognized as the common information programme for the Member States of the United Nations. Simultaneously, similar efforts in the organization of national information systems are being undertaken in a number of Asian countries in the region, particularly in India, Sri Lanka and Iran, using the assistance of the UNDP, bilateral assistance sources and in some cases with local financing. Regional co-operation is being promoted, and already in the South and Central Asian region two regional meetings connected with the development of regional information policies and co-operation for exchange of scientific and technological information have been held in Sri Lanka and in India in 1975-76. A draft proposal for the establishment of a regional network which would provide the vehicle for information transfer in the region has been submitted to UNDP for consideration in the Second Country Programme. A similar proposal for a scientific and technological information network in South East Asia which would ensure technical co-operation in at least five countries in the region is also under consideration by UNDP for future financing in its regional programme. The areas of technical co-operation will include transfer of technical information between developing countries, particularly agricultural, industrial and economic information of particular relevance to countries in the same region; agreements on methods, techniques and standards to be adopted; common training facilities and standardization of training methods and curricula; meetings and seminars, for the purpose of evolving common policies.

## PART II - D - BACKGROUND AND JUSTIFICATION

The Pakistan National Scientific and Technical Documentation Centre (PANSDOC) was established in 1957 by the Government of Pakistan with technical assistance from Unesco. The primary and immediate objective before PANSDOC was to provide scientific workers with urgently needed facilities, such as the procurement of documents, compilation of bibliographies and provision of translation services. In 1963 and 1964, two regional centres of PANSDOC were established at Dacca and Lahore respectively.

The PASTIC project was drafted in 1972 to extend the services of the former Pakistan National Scientific and Technical Documentation Centre (PANSDOC) and is a constituent unit of the Pakistan Science Foundation. It was created to permit research councils, research institutions and all users of science and technology to benefit from a national information system through an international network of scientific and technological information.

In October 1976, a team of consultants from the International Development Research Centre (IDRC), Unesco and UNIDO undertook a three week mission in Pakistan to make a detailed study of the needs of scientific information in the country and, on this basis, to make recommendations to the Government on the future organization, structure and development of PASTIC. The present project proposal is based on the findings of this Mission and identifies the UNDP inputs necessary for the organization of PASTIC on the lines recommended by the Mission.

Further details on the background and justifications for this project are contained in the report of the Mission to which this project proposal is annexed.

## PART II - E - OUTPUTS

### (i) CO-ORDINATION OF RESOURCES

1. Directory of important libraries and documentation centres in Pakistan (as required)
2. List of libraries and documentation centres co-operating in the network with details of staff, collections and services (as required)
3. Directory of users of information and profiles of subject interest (annual)
4. Directory of on-going research activities (annual)
5. Acquisitions list of PASTIC (monthly)
6. Union list of periodicals processing techniques and library organization for co-operating libraries
7. Manual of information processing techniques and library organization for co-operating libraries
8. General introductory leaflet for users of network services
9. Bibliography of scientific literature of Pakistan (monthly or quarterly)

### (ii) SERVICES TO USERS

10. Selective dissemination of information services (SDI)
11. Bibliographies
12. Microfilms, microfiches and photocopies of documents for storage or for providing responsive services
13. Translations

### (iii) TRAINING OF PERSONNEL

14. Training programmes for information personnel

15. Training programmes for users

(iv) RESOURCE DEVELOPMENT

(v) DEPOSITORY OF SCIENTIFIC WORK PRODUCED IN THE COUNTRY

(i) CO-ORDINATION OF RESOURCES

1. Directory of important libraries and documentation centres in Pakistan

(a) A systematic survey of libraries and documentation services in Pakistan will be carried out to enable the establishment of a file. This will include as complete data as possible on the holdings, services, personnel and characteristics of these institutions 1978 continuing (PASTIC)

(b) On the basis of this file, a directory will be published and distributed to institutions and individuals March 1979 (PASTIC)

(c) The file will be revised as necessary, and new data included as required (PASTIC)

2. List of libraries and documentation centres co-operating in the network with details of staff, collections and services

(a) This file will be based on (1) but will be organized on a subject basis, e.g. agriculture, industries, etc. to assist scientists to identify the libraries constituting the sub-system of the network in their specialized fields 1980 continuing (PASTIC)

(b) The file will be revised as necessary and new data included

3. Directory of users of information and profiles of subject interest

- (a) A systematic survey of scientists and technologists will be undertaken to establish a directory of potential users of the information system. The survey will be conducted so as to obtain profiles reflecting the specific interests of users in preparation for SDI as well as for planning the future development of the system 1978 continuing (PASTIC)
- (b) The directory will be published and revised as often as necessary to include new data 1979 continuing (PASTIC)

4. Directory of on-going research activities

- (a) PASTIC will establish contact with institutions in the country in which scientific and technological research is being conducted, as well as with national organizations which finance research activities through grants, fellowships, etc. On the basis of these contacts, a register of on-going research activities will be published 1978
- (b) The register will be published annually and revised to include new data 1979 continuing



5. Acquisitions list of PASTIC

PASTIC will publish periodically a list of its acquisitions, particularly of monographs and secondary journals. This publication would inform other libraries in the network of the acquisitions of PASTIC and be a basis for the development of a co-ordinated acquisitions policy in the country

1978  
(PASTIC)

6. Union list of periodical holdings of important libraries in the country

(a) A survey will be conducted by PASTIC of the periodical holdings of important scientific and technological libraries in the country

1978  
(PASTIC)

(b) A union list of periodicals in Pakistan will be published and arrangements will be made to have it updated regularly

1979  
(PASTIC)

(c) The list will be distributed to all important libraries in the country

1979

7. Manual of information processing techniques and library organization

(a) Using established UNISIST guidelines and after evaluation of the methods and techniques applied at PASTIC, a manual will be produced for the use of co-operating institutions

1979

(b) The manual will be published and distributed

1979

(c) It will be updated as necessary (as required)

8. General introductory leaflet for users of network services
  - (a) This leaflet will provide information to users on how they should proceed to get information needed by them. It will identify the chief libraries of the sub-networks and list the services provided by PASTIC and the co-operating libraries 1979
  - (b) The leaflet will be updated as more sub-networks are formed
9. Bibliography of scientific literature of Pakistan
  - (a) An indexing manual will be established for this purpose and indexers and abstractors will receive in-service training 1978
  - (b) Establishment of techniques for the collection of information 1978
  - (c) Processing of information in a format that will allow later computerization 1978 continuing
  - (d) Publication of the bibliography at regular intervals 1979 continuing
- (ii) SERVICES TO USERS
10. Selective dissemination of information services
  - (a) Steps will be taken to expand the AGRIS and INIS services that have been established with the assistance of IDRC 1979
  - (b) Additional machine readable files will be processed to provide a wider range of user services 1979
  - (c) Files built up by PASTIC, e.g. the file on scientific research in Pakistan will be prepared for processing by computer 1979

- (d) SDI services based on these files 1980  
will be established on a regular  
basis

#### 11. Bibliographies

PASTIC will provide bibliographies 1980  
based on secondary publications continuing  
in its library as well as on  
machine readable files obtained  
from various services. These  
services will be provided to  
scientific research workers in  
the country

#### 12. Reprographic services

The photocopying and microfilming 1979  
units will be established. continuing  
Services will be provided to  
users in the country in the form  
of photocopies, microfilms and  
microfiches of materials available  
in the PASTIC library

#### 13. Translations

A file on all performed 1979  
translations will be maintained continuing  
as well as listings of  
translations that have been  
done abroad. A panel of  
translators will be set up to  
undertake on contract  
translations requested from  
PASTIC by its users. A small  
translation service will be  
maintained at PASTIC

### (III) TRAINING OF PERSONNEL

#### 14. Training programmes for information personnel

A training course will be 1978  
established for training post continuing  
graduate information specialists  
at Quaid-e-Azam University  
and PASTIC

Several training courses for 1978  
middle level personnel and continuing  
technicians will be set up

## 15. Training programmes for users

PASTIC staff will organize at the Centre as well as at various institutions in the country, training programmes for users of scientific and technical information	1978 continuing
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### (iv) RESOURCE DEVELOPMENT

PASTIC will build up its collection of secondary journals in as many fields as possible to enable it to provide bibliographic information and current awareness services on request	1978 continuing
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It will also acquire reference tools and selected monographs according to the needs of regular users of its services	1978 continuing
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Journal holdings will be located at co-operating libraries and PASTIC will acquire only those primary journals which are considered as absolutely essential for providing services

### (v) DEPOSITORY OF SCIENTIFIC WORK PRODUCED IN THE COUNTRY

PASTIC will organize a scheme to receive copies of all scientific papers, reports, conference documents and proceedings and other materials resulting from scientific work in the country. These materials will be analyzed and listed and a file maintained (see Co-ordination of Resources (PART II E (9))).	1978 continuing
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## PART II - F - ACTIVITIES

The following may be considered the principal aims of the project.

1. The establishment of a national network of scientific and technical information through the co-ordination of the activities of existing information providing institutions and their further development.

2. The strengthening and development of PASTIC so that it could function as the central institution in the network. In addition to some information providing functions, it will also set standards and methodologies, provide financial and technical support to co-operating institutions, operate and evaluate pilot projects established for testing new technologies, collect and provide data to government agencies for formulation of national information policies, act as a national referral centre and organize training programmes at the national level.

The project will be implemented in three phases:

PHASE I (1978-1979) will be primarily devoted to re-organization of PASTIC to play its role in the national information system by:

- strengthening collections of secondary publications
- establishing microfilming and printing units
- carrying out surveys described in Part II - E and setting up processes for updating the information files
- recruiting and training personnel
- identifying suitable co-operating libraries and establishing the necessary agreements
- developing the agricultural and industrial information sub-networks

PHASE II (1980-1981) strengthening and further development of the national information system by:

- evaluation of the results of the agricultural and industrial sub-networks
- identifying additional sub-networks in accordance with needs of users and establishing agreements for co-operation

- continuing recruiting and training personnel and an increased national role in the training of information personnel
- establishing the basis for SDI services using computerized techniques
- studying information transfer processes in the light of Pakistan's programme for development of telecommunications services
- establishing data files in machine readable form and producing computer-assisted publications

### PHASE III (1982)

On the assumption that, by the end of 1981, the national network of scientific and technical information will have been established, so as to cater to the needs of the majority of users in the country, this Phase will be devoted to:

- introduction of new techniques in all aspects of information processing, retrieval and dissemination
- study of the feasibility of linkage with international information systems for obtaining scientific information not available in the country through on-line techniques
- study of the feasibility of a computerized network in the country and pilot projects where appropriate
- facilities for exploiting the products of international information systems and for providing regular services on the basis of the system
- appropriate training programmes for these purposes
- study the possibilities of participating in regional information systems

Activity	Output	Starting Date	Completion Date
PHASE I			
1. Strengthening collections by acquisition of secondary journals and selected monographs	User services - Subject bibliographies	1978	continuing
2. Establishing microfilming, microfiche and photocopying units	User services - information transfer in microforms to co-operating libraries	1979	1979
3. Establishing printing unit	Producing the documents and publications of the network	1978	1978
4. Surveys, directories and lists	Publications listed in Part-II E (1-9)	1978	continuing
5. Recruiting and training personnel	Information scientists for PASTIC and other institutions in the network (10 professionals). Also foreseen is in-service training for staff at all levels	1978	continuing
6. Negotiation of agreements with institutions for expansion of network	Increase in the number of subject fields covered by the network	1979	continuing
7. Developing the agricultural and industrial information sub-networks	Information services to specialized users in agriculture and industry from organized sub-networks of agricultural and industrial information	1978	continuing
PHASE II			
8. Evaluation of the agricultural and industrial sub-networks	This will provide guidelines for the creation of new sub-networks foreseen in this phase of the project	1980	1980
9. Identifying additional sub-networks and establishing agreements for their co-operation	Expansion of networks	1980	
10. Training of personnel	Increased number of information specialists for PASTIC as well as for sub-networks	1980	continuing
11. Centralized SDI services to users	Regular information to scientists through computer processing of information-bearing tapes	1980	

Activity	Output	Starting Date	Completion Date
12. Studying information transfer processes in the network and further development of techniques	Improved methods for information transfer from the network to the user	1980	
13. Establishing data files in machine-readable form and producing publications	Possibilities of quick retrieval of information	1980	
14. Continuation of the activities established in Phase I		1980	
PHASE III			
15. Introduction of new techniques in information processing, retrieval and dissemination	Modernization of information-handling by the Centre, following a period of building up of the infrastructure of the system		
16. Study of possibilities of linkage with foreign information systems	Will accelerate access to information not available locally	1982	
17. Exploiting products of international information systems	Cheap and comprehensive service to users in some fields of science and technology covered by international information systems	1981	continuing
18. Training programmes	As above, but with the curriculum reflecting new advances in the field	1981	continuing
19. Participation in regional information systems	Linkage with countries of similar social and economic conditions whose information may be more relevant to development activities undertaken in the country	1981	



## PART II - G - PREPARATION OF WORK PLAN

A detailed Work Plan for the implementation of the project will be prepared by the Chief Technical Adviser, in consultation with the Project Director. This will be done at the start of the project and brought forward periodically. The agreed upon Work Plan will be attached to the Project Document as Annex I and will be considered as part of that document.

## PART II - H - PREPARATION OF THE FRAMEWORK FOR EFFECTIVE PARTICIPATION OF NATIONAL AND INTERNATIONAL STAFF IN THE PROJECT

The activities necessary to produce the indicated outputs and achieve the project's immediate objective will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined by their leaders, by mutual discussion and agreement, at the beginning of the project, and set out in a Framework for Effective Participation of National and International Staff in the Project. The Framework, which will be attached to the Project Document as an annex, will be reviewed from time to time. The respective roles of the national and international staff shall be in accordance with the established concept and specific purposes of technical co-operation.

## PART II - I - DEVELOPMENT SUPPORT COMMUNICATION

The project aims at setting up a system that will enable users of scientific and technical information to obtain their needs rapidly and to ensure that the information obtained is relevant to their needs. There is a wide spectrum of users of information and the system will provide through translations, through repackaging of information, through publications written in popular style, through agricultural and industrial extension services, an opportunity for the information to reach the user in a form and manner in which he can understand it and apply it in his development activities. At the other end of the spectrum is the sophisticated user whose interests are in the results of scientific activity in other parts of the world and who needs this information in undiluted form. Surveys will therefore have to be carried out at regular intervals to determine the impact of information services on these various types of users and the orientation of the network's services will have to be modified according to these findings.

UNISIST is developing guidelines for measuring user reaction to information services, techniques for the training of users, studying the impact of information on farmers and small scale industrialists and designing evaluation techniques for all types of information activity. The results of these studies could be profitably applied in this project.

## PART II - J - INSTITUTIONAL FRAMEWORK

The position of the project within the National Science Foundation has been described in detail in the Joint Mission Report and in the preceding sections of this document.

The project bears an important relationship to all agencies, organizations and projects in the country as it has been set up as the principal information-providing organization in the country. This relationship is expected to become even more significant when the project begins to collaborate with other libraries and documentation centres in the network and thus considerably expands the base of its operations.

The project will be located at Islamabad but the network will cover the entire country.

## PART II - K - PRIOR OBLIGATIONS AND PREREQUISITES

### Prerequisites of the Government

- Action towards provision of an adequate building for PASTIC
- Action towards recruitment in 1977 of the staff identified as necessary for commencement of the activities of the project
- Action towards allocation of a substantially larger annual budget for PASTIC according to indications given in this document

### Prerequisites of the Executing Agency

- Provision of UNDP funds for pre-project activities in 1977, in particular for a two month mission by the Chief Technical Adviser for preparation of the Work Plan and for ordering equipment necessary to start

some of the services at the beginning  
of 1978.

**PART II - C - FUTURE UNDP ASSISTANCE**

It is not at present envisaged that additional UNDP assistance will be required after the project is completed at the end of 1982.

**PART III - SCHEDULES OF MONITORING, EVALUATION  
AND REPORTS**

**Part III - A. Tripartite Monitoring Reviews,  
Technical Reviews**

1. The project will be subject to periodic review in accordance with the policies and procedures established by the UNDP for monitoring project and programme implementation.
2. Special technical reviews will be undertaken by Unesco at the end of Phase I of the project (October 1979) and at the end of Phase II (October 1981).

**Part III - B. Evaluation**

The project will be subject to evaluation, in accordance with the policies and procedures established for this purpose by the UNDP. The organization, terms of reference and timing of the evaluation will be decided by consultation between the Government, the UNDP and the Executing Agency concerned.

**Part III - C. Progress and Terminal Reports**

Type	Responsible Officer	Date of Submission
Progress Reports	Chief Technical Adviser	30 Mar. '78
	"	30 Sept.'78
		30 Sept.'79
		30 Mar. '80
		30 Sept.'80
Tripartite Review Report	Resident Representative	to be determined
Agency Technical Reports	Unesco/UNIDO	30 Oct. '79
	Unesco/UNIDO	30 Oct. '81
Agency Terminal Report	Unesco	30 Nov. '82

## DESCRIPTION OF GOVERNMENT INPUTS

### 1. Description of Government Inputs

#### A. Financial Obligations

The Government will finance the budget of the Pakistan Scientific and Technological Information Centre and the Network to the amount of Rs 6 599 415 (Rs 65.99 lakhs), for a period of 5 years commencing from January 1978, and provide comparable support annually afterwards.

#### B. Assignment of National Staff (Location: Islamabad)

	Starting Date	Take-over Date
1. Director of PASTIC The director will provide general guidance of the project staff until the project comes to an end.	Jan.1977	Jan.1981
2. Specialists-grade 19 (2)	Jan.1978	Jan.1981
3. Specialists-grade 18 (21)	Jan.1978	Jan.1981
4. Specialists-grade 17 (5)	Jan.1978	Jan.1981
5. Specialists-grade 16 (16)	Jan.1978	
6. Technicians-grade 15 (5)	Jan.1978	
7. Clerk-typists-grade 14 (2)	Jan.1978	
8. Clerk-typists-grade 13 (2)	Jan.1978	
9. Typists-grade 12 (14)	Jan.1978	
10. Typists-grade 11 (9)	Jan.1978	
11. Attendants-grade 5 (3)	Jan.1978	

In addition to the national staff in the above schedule, other technical and administrative staff will be recruited for the housekeeping of the Centre.

NOTE: Starting date = expected date of assignment of the national staff on a full-time basis

Take-over date = date at which the national staff is expected to assume major or

full responsibility for the project's activities in its field of competence

C. Training Provisions

	Cost in Rupees
Maintenance of trainees at courses to be arranged at PASTIC for training the staff of the Centre as well as of the co-operating libraries of the network.	300 000

D. Government Provided Buildings, Equipment and Supplies

	Location	Delivery Date	Cost in Rupees
EXPENDABLE EQUIPMENT			
(a) Supplies	Islamabad	According to needs	500 000
(b) Provision of subventions to co-operating libraries in the network	selected libraries in Pakistan	"	800 000
NON-EXPENDABLE EQUIPMENT			
(a) Buildings	Islamabad	Jan.1978	not yet known
(b) Equipment and furniture for Officers	Islamabad Regional	According to needs	500 000
(c) Reprographic and Printing Equipment for the Centre			
In addition to that which will be provided by UNDP, additional equipment will be acquired as necessary from the above allocation			
(d) Books and periodicals			800 000

E. Miscellaneous

(a) Operation and maintenance of equipment	125 000
(b) Sundry, e.g. transport and handling of equipment, water supply, electricity, telephones, travelling, contingencies.	500 000

## UNDP INPUTS

### Preparatory Activities

No.	Assignment of International Staff	Location	Starting Date	Duration
01	Consultant Architect To examine initial proposals for the physical facilities of PASTIC	Islamabad	Oct. Nov. '76	10 days
02	The consultant architect will carry out a second mission to assist in the preparation of construction, drawings and building plans	Islamabad	Mar. '77	1 month



## Project Activities

No.	Assignment of International Staff (Location: Islamabad)	Starting Date	Duration
01	Chief Technical Adviser Job requirements: Qualifications in the field of automated systems for scientific and technical information and experience in organizing and administering information networks. The Chief Technical Officer will be responsible for the co-ordination of the work of the other experts attached to the project in accordance with the work plan.	Nov.1 '77	38 m/m
02	Consultant in industrial		
03	information for extension services Job requirements: Qualifications in information science and experience in the organization of industrial information services		
	2 consultants will be	Oct.1 '78	3 m/m
	provided to set up an	Oct.1 '79	3 m/m
	industrial information extension service which will be organized through the collaboration of PASTIC with relevant Government Departments and other organizations in the country.		
04	Consultant in Scientific and Technological Information		
	Job requirements: Professional qualifi- cations in information	Oct.1 '78	6 m/m

science and experience in the organization of scientific and technological information services, with some knowledge of computerized systems.

05 Consultant in reprography

Job requirements: Oct.1 '78 6 m/m  
experience in the organization and management of reprographic services in support of information activities, preferably with experience in the training of personnel.

06 Consultant in agricultural information

Job requirements: Oct.1 '79 6 m/m  
professional qualifications in information science and experience in agricultural information services. The consultant will be required to maintain liaison with AGRIS and to establish an agricultural information network in the country.

07 Consultant in economic information

Job requirements: Oct. '80 6 m/m  
professional qualifications in information science and experience in economic and social information activities. The consultant will be required to set up the basis for a social and economic network in the country.

08 Consultant in printing

Job requirements: long experience in the operation and maintenance of modern printing equipment. The consultant will be required to set up the basis for the production of the publications of PASTIC and its network and to provide in-service training.

Oct. '80

6 m/m

- 09 Additional consultant services will be required for the purpose of evaluation of efficiency and output of the various systems that comprises the network and for advising PASTIC on particular problems that might arise during implementation of the project.

1980  
1981

2 m/m

TRAINING PROVISIONS

A total of 8 fellowships will be provided for training of the senior staff of the project.

	Location	Level	Date	Period
1. Fellowship in information management and network operations (for the Director of the Centre)	UK/USA	II/III	Oct.78 Dec.79	15 m/m
2. Fellowship in scientific and technological information	"	"	Oct.78 Mar.79	6 m/m
3. Fellowship in reprography	"	"	Oct.78 Mar.79	6 m/m

4. Fellowship in industrial information	"	"	Oct.78 Dec.78	3 m/m
5. Fellowship in industrial information	"	"	Oct.79 Dec.79	3 m/m
6. Fellowship in agricultural information	"	"	Oct.79 Mar.80	6 m/m
7. Fellowship in economic information	"	"	Oct.80 Mar.81	6 m/m
8. Fellowship in printing	"	"	Oct.80 Mar.81	6 m/m

GROUP TRAINING  
(Location: Islamabad)

	Starting Date	Duration
In collaboration with Quaid-e-Azam University, PASTIC will undertake a programme for training about 10 university graduates each year in modern information handling. This training is expected to lead to a Master Degree in Information Science and will be the first specialized training of its kind available in the country.	1978 1979 1980 1981 1982	one year " " " "

EQUIPMENT SUPPLIED BY UNDP

A sum of \$25 000 has been provided for the purchase of expendable equipment for the project. This will be used to acquire materials required for information handling and processing in the various activities that have been outlined in the work plan.

Non-Expendable Equipment

1978	Cost in \$
Books and Journals	50 000
Photocopying machines	
Xerox type (3 units) at \$5 000 each	15 000
Other type (3 units) at \$1 500 each	4 500
Printing equipment	
Printing Machine-Gestetner 213	7 400
Composing Machine-Varityper 1010F	7 600
Wire Stitching Machine	3 600
Reproduction Camera	3 000
Plate Maker, or Exposure Unit	2 000
Spares	2 000
Vehicles	
Project car	5 000
Scooter	1 250
Teaching aids	
Tape recorders, projection equipment, etc.	5 000
Office equipment	
Typewriters, etc.	2 500
TOTAL	\$113 250

1979	
Books and Journals	12 500
Photocopying machines	
Xerox type (2 units) at \$5 000 each	10 000
Other type (2 units) at \$1 500 each	3 000
Printing equipment	
Paper cutting machine	8 000
Headliner	3 000
Paper folding machine	8 000
Spares	2 000
Photographic equipment	
Industrial Microfile camera	16 000
Microfile machine MRD2	14 000
Industrial printer	6 000
Vehicles	
Scooter	1 250
Office equipment	
Typewriters	2 500

# 1980

Books and journals	12 500
Data processing equipment: Collator, Card Punch equipment (3 units)	15 000
Teaching aids	5 000
Office equipment	2 000

# 1981

Books and journals	12 500
Data processing equipment: Magnetic tape units (x2), Tape control unit	25 000
Office equipment	2 000

# 1982

Books and journals	12 500
Office equipment	1 000

# MISCELLANEOUS

Operation and maintenance of equipment	\$10 000	1978/1982
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SUNDRIES	\$21 500
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TERMINAL REPORT	\$ 1 500	1982
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# DIRECT COSTS

Mission cost Unesco	\$ 2 500	(mid-project review 1979 and technical review 1981)
Mission cost UNDP	\$ 2 500	

PROJECT BUDGET COVERING GOVERNMENT CONTRIBUTION IN KIND  
(In Rupees)

Country : PAKISTAN  
Project No.: PAK/75/064/A/02/13  
Title : Pakistan Scientific and Technological  
Information Centre (PASTIC)

T O T A L		1978		1979		1980		1981		1982	
m/m	Rs	m/m	Rs	m/m	Rs	m/m	Rs	m/m	Rs	m/m	Rs
10. PROJECT PERSONNEL											
Counterpart to Chief Technical Adviser (Director)	60	12		12		12		12		12	
Executive Assistant to Director (1 Specialist)	60	12		12		12		12		12	
Policy Development Unit (3 Specialists)	180	36		36		36		36		36	
Network Co-ordinating Unit (3 Specialists)	180	36		36		36		36		36	
Training Unit (1 Specialist)	60	12		12		12		12		12	
Regional sub-offices (12 Specialists)	720	144		144		144		144		144	
National Inventory of Pakistani Information (9 Specialists)	540	108		108		108		108		108	
Clearing House, referral services and document-procurement unit (1 Specialist)	60	12		12		12		12		12	
Translations unit (2 Specialists)	120	24		24		24		24		24	
Bibliographic unit (2 Specialists)	120	24		24		24		24		24	
Development support unit (2 Specialists)	120	24		24		24		24		24	
Data processing unit (4 Specialists)	120			12		24		36		48	
Technical support-services (4 Specialists)	192	24		24		48		48		48	
Technical and clerical staff (not including technical and administrative support services (35))	2100	420		420		420		420		420	
COMPONENT TOTAL	4632 3 074 415	888	588 015	900	596 400	936	621 600	948	630 000	960	638 400

Project Budget covering Government Contribution in Kind (Cont'd)

		T O T A L		1978		1979		1980		1981		1982	
		m/m	Rupees	m/m	Rs	m/m	Rs	m/m	Rs	m/m	Rs	m/m	Rs
30.	TRAINING												
	31. Training of Information specialists and sub-professional staff		300 000		60 000		60 000		60 000		60 000		60 000
39.	COMPONENT TOTAL		300 000		60 000		60 000		60 000		60 000		60 000
40.	EQUIPMENT												
	41. Equipment		2 600 000		400 000		400 000		600 000		600 000		600 000
49.	COMPONENT TOTAL		2 600 000		400 000		400 000		600 000		600 000		600 000
50.	MISCELLANEOUS												
	51. Miscellaneous		625 000		125 000		125 000		125 000		125 000		125 000
59.	COMPONENT TOTAL		625 000		125 000		125 000		125 000		125 000		125 000
99.	GRAND TOTAL		6 599 415		1 173 015		1 181 400		1 406 600		1 415 000		1 423 400



Country : Pakistan  
 Project : PAK/75/064/B/01/13  
 Title : Pakistan Scientific & Technological  
 Information Centre (PASTIC)

Project Budget covering UNDP Contribution  
 (in US Dollars)

COMPONENT	TOTAL		1976		1977		1978		1979		1980		1981		1982	
	m/m	\$	m/m	\$	m/m	\$	m/m	\$	m/m	\$	m/m	\$	m/m	\$	m/m	\$
10. <u>Project Personnel</u>																
11 <u>Experts</u>																
11-01 Chief Technical Adviser	38.3	163 450	0.3	1 140	2	7 800	12	50 710	12	51 500	12	52 300	-	-		
11-41 Consultants	28	123 740			1	5 150	13	52 300	10(2)	42 620	2	11 350	2	12 320		
11-99 Sub-Total	66.3	287 190	0.3	1 140	3	12 950	25	103 010	22	94 120	14	63 650	2	12 320		
13. Administrative support personnel		60		60		-		-		-		-		-		
15. Travel Costs		12 230		50		480		4 325		4 115		2 830		430		
16. Mission Costs		5 000		-		-		-		2 500		-		2 500		
19. Component Total		304 480		1 250		13 430		107 335		100 735		66 480		15 250		
30. <u>Training</u>																
31. Individual fellowships	51	68 900		-		-	12	19 600	24	29 600	9	13 100	6	6 600	-	
38. Group Training		25 000						5 000		5 000		5 000		5 000		5 000
39. Component Total		93 900						24 600		34 600		18 100		11 600		5 000
49. <u>Equipment</u>		307 000		-		-		113 250		91 250		39 500		44 500		18 500
50. <u>Miscellaneous</u>																
51. Operation and maintenance of equipment		10 000		-		-		2 000		2 000		2 000		2 000		2 000
52. Reporting Costs		1 500		-		-		-		-		-		1 500		-
53. Sundry		21 500		-		500		5 000		6 000		7 000		2 500		500
59. Component Total		33 000		-		500		7 000		8 000		9 000		6 000		2 500
99. UNDP TOTAL CONTRIBUTION		738 380		1 250		13 930		252 185		234 585		133 080		77 350		26 000

## Annex VII

### ACRONYMS USED IN THIS REPORT

AGRIS	International Information System for Agricultural Sciences and Technology
APQ	Asian Productivity Organization, Tokyo
ARC	Agricultural Research Council, Islamabad
CDA	Capital Development Authority, Islamabad
CENTO	Central Treaty Organization, Ankara
COMPENDEX	Computerized Engineering Index
DESTO	Defence Science and Technological Organization, Islamabad
DEVNIS	Development Sciences Information System
ESA/RECON	European Space Agency Information System
ESCAP	Economic and Social Commission for Asia and the Pacific, Bangkok
FAO	Food and Agricultural Organization, Rome
GATT	General Agreement on Tariffs and Trade, Geneva
IAEA	International Atomic Energy Agency, Vienna
IBE	International Bureau of Education, Geneva
IBM	International Business Machines
ICL	International Computers, Limited
IDRC	International Development Research Centre, Ottawa
IERIS	International Education Reporting Service
ILO	International Labour Office, Geneva
INIS	International Nuclear Information System
INSPEC	International Information Services for the Physics and Engineering Communities
ISIS	Integrated Set of Information Systems
ISO	International Organization for Standardization, Geneva
JPMC	Jinnah Post-Graduate Medical Centre, Karachi
METADEx	Metal Abstracts
NASA	National Aeronautics and Space Administration
NATIS	National Information Systems, Unesco
NHL	National Health Laboratories, Islamabad
NIEO	New International Economic Order
PANSDOC	(former) Pakistan National Scientific Documentation Centre, Karachi
PakSTI-NETWORK	Pakistan Scientific and Technological Information Network
PASTIC	Pakistan Scientific and Technological Information Centre, Islamabad
PCSIR	Pakistan Council for Scientific and Industrial Research, Islamabad
PICIC	Pakistan Industrial Credit and Investment Corporation, Karachi
PIDE	Pakistan Institute of Development

PINSTECH	Economics, Islamabad Pakistan Institute for Nuclear Science and Technology, Islamabad
PITAC	Pakistan Industrial Technical Assistance Centre, Lahore
PLA	Pakistan Library Association
POPINS	Population Information System
PSF	Pakistan Science Foundation, Karachi
RCD	Regional Co-operation for Development, (Iran, Turkey, Pakistan)
SDI	Selective Dissemination of Information
SPIL	Society for the Promotion and Improvement of Libraries, Karachi
TCDC	Technical Co-operation among Developing Countries
UBC	Universal Bibliographic Control
UGC	University Grants Commission, Islamabad
UNCTAD	United Nations Conference on Trade and Development, Geneva
UNDP	United Nations Development Programme, New York
UNESCO	United Nations Educational, Scientific and Cultural Organization, Paris
UNIDO	United Nations Industrial Development Organization, Vienna
UNISIST	World Information System for Science and Technology, Unesco
USIS	United States Information Service
WAPDA	Water and Power Development Authority, Lahore